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Defense Industry and Conversion***

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Military Affairs

Defense Industry and Conversion

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DEFENSE INDUSTRY AND CONVERSION: POLICY

Ukrainian Minister Antonov Discusses Conversion Options

93UM0575A Kiev GOLOS UKRAINY in Russian
15 May 93 p 3

[Interview with Minister for Machine Building, the Military-Industrial Complex and Conversion, Viktor Antonov: "Independence is Fine, But We Would Like to Live Well Too"]

[Text] Machine Building has traditionally been called the core of an economy, determining its level, its survivability, its capacity for optimal and effective reorganization, and its competitiveness. It is thought that Ukraine is a highly developed industrial power, objectively capable of assuming a decent place in Europe. But time is passing, and we are rolling ever more deeply into economic crisis, and we find it impossible not only to create an integrated program of transformations, but even to sketch out even the near-term prospects for possible stabilization. Are we really so untalented, or are there significant causes? A conversation on this topic with the Minister for Machine-building, the Military-Industrial Complex and Conversion, Viktor Antonov.

[Question] It is my mentality that I like to lay everything out in the open. Why after proclaiming independence, do we still have such a poor economy?

[Antonov] This is a confluence of circumstances and problems. First of all, we are building Ukrainian statehood, a banking system, industrial administration, and a monetary system, we are creating a Constitution, and structures of parliamentary and presidential power, and a Cabinet of Ministers, and are effecting the separation of these powers. And don't forget the army, the customs service, and the borders. Practically all of these functions used to belong to Moscow, and we are starting from zero. Give us 5 or 10 years, and then we will show you what sort of state we create. How many years did the U.S. take to reach its present prosperity? More than 200 years!

The second problem is the very profound economic crisis which was provoked by the transition from one political system to another, from command methods of administration to economic methods. We recall the thirties, the enormous slump in the economies of capitalist countries. But this occurred within the framework of a single system, while we are forced to change everything as we go.

Before, the Gosplan made ends meet. Now we are heading towards market relations. And here it turns out that we do not have a clear idea of our own internal market: how many tractors and combines are required, for example, and who will pay the manufacturing enterprises for them? This is one cause of the economic crisis.

A second cause is conversion. I understand this term more broadly than deep structural perestroika. For example, conversion of the army. We now have 700 thousand service members, and we need 400 thousand (and perhaps 200 thousand). How can we make these changes, no one knows. You see, we have to pay pensions to the discharged soldiers, we have to retrain them, provide them with jobs and housing.

Conversion of the social sphere. If we have market relations, some call them capitalist relations, then you have to purchase an apartment yourself, completely pay for its maintenance, pay for education, pay for health care. But even my pay is not enough to keep an apartment, let alone purchase it. So how long will we continue to retain elements of old economic relations between the state and individual? And when will people be able to support themselves on their earnings?

Conversion proper of the military industry. We have reduced production of military equipment by a factor of three. The Americans, for example, are annually reducing military orders by 3 percent. And this is hard for them, it requires great effort and expenditure. It is all the harder for us, we are unable to sharply change the direction of our activity. And then if we do change our production, who will need it, and who will buy it? For us right now the most respected person is the customer.

[Question] Viktor Ivanovich, I have met with agricultural people who say that they are prepared to place hundreds of orders with you for different types of equipment. But your enterprises won't take them.

[Antonov] That's right. We calculated how much the finished goods would cost. Participating in this process were 128 managers of enterprises, academicians, and professors. In the Program they arrived at a figure of 10 trillion karbovantsi. So then I wondered, will the state and collective farms, will the farmers have that kind of money? And for 50 percent of them I can say no. So we asked the agricultural leadership to create a permanent national technical center which might approach these problems flexibly. We have to be confident that someone signing a contract for production of equipment does not refuse the order, and that he will pay the money.

At the same time we have to think about market conditions, we have to work at marketing. Unfortunately, that is a weak spot here. You see, some things we can do ourselves, for example combines, and some things, for example equipment for producing baby food, it is more advantageous to order abroad. We must purchase licenses, samples . . . We are gaining experience.

[Question] Nonetheless the process of changing the profile of the military-industrial complex is irreversible. The fate not only of our branch, but of practically the whole economy will depend on how quickly and by what route you do this.

[Antonov] It is hard to argue with that. There are several variants.

First, let the enterprises survive as they may, "shock conversion." After analysis we concluded that this would not result in anything good. Yegor Gaydar once said that he was working at stabilizing the economy at the macro level with the help of monetary policy and stabilization of money, and the rest would take care of itself. But he forgot that this is a principle of capitalism, classical capitalism, where everyone is making money. But we have lived for almost 70 years in a different dimension. Here is an example. Poland stabilized the zloty, but 70 percent of its industry is not operating. Look at the German market, the best money in the world, but still the economy of the former GDR is in decline, and the government of the FRG was forced to spend hundreds of billions of marks to somehow restructure the eastern regions for capitalist relations.

The macro level is necessary, but it alone is insufficient; our enterprises are simply stopping. So we did not adopt the first variant.

There is another way. Sell military equipment, and put the hard currency into conversion. This is possible once. As a strategic variant, no. We receive 80 percent of our components from somewhere else. Under these conditions, it would be unreasonable to expect that we would be given everything in full volume so that we could enter the international market. On the other hand, the U.S., France, Israel, China, and Russia are all selling weapons. That same Russia has retained its former Union structures: defense-export, the main technical directorate. They know the business conditions. But we are just creating such a mechanism.

As I see it, we should choose a Ukrainian variant which would include all of the positive factors of the first two. In other words, we are in favor of stabilization at the macro level, and of using export capabilities, but in the process the state must provide support to conversion.

With this goal we are marketing the Ukrainian market. At its base we have created 540 programs: electrical equipment, complex consumer instruments, ship-building, aviation, automobile construction and so forth. We have determined the enterprises which can shift to production of a particular civilian product. When orders appear, we immediately place them and provide the minimal financial support, with the property as security. Failure to meet the terms means bankruptcy.

[Question] In conversation you have touched in one way or another on foreign experience. Do your contacts with foreign firms remain at the study level, or do you have closer ties?

[Antonov] We have devised four directions of interaction with the world market.

First. Creation of joint enterprises and joint stock companies. We now have more than 800 of them. Some are doing well, some are doing poorly. I am in favor of not limiting foreign stock capital: from 0 to 100 percent. Zero means its our company, fifty-fifty means its half

ours and half theirs. One hundred percent, they build their plant here. We are leasing the land for 99 years, and they pay and build here.

The second direction is the compensation method. We need equipment for deep refinery of petroleum. Abroad it has reached up to 85-90 percent, while here it is only 50 percent. There are foreign companies that can deliver the equipment to us, and we will pay them with fuel oil, for example. We need machines for cold rolling of steel. We need tin for the canning industry. We are prepared to receive the necessary equipment and pay in products.

Yet another direction is accumulation. Through intensification of export, we increase the influx of hard currency, and sell 50 percent of the total to the state. From the accumulations formed we invest in priority areas of the Ukrainian economy.

And finally the last, use foreign credits: of interstate, state, and private banks. Other sources. As a rule the investments should go to specific projects on a commercial basis.

[Question] These are general areas of interaction. But is there a concrete embodiment?

[Antonov] The forms may vary. For example, the operational-routine form. We are prepared to cooperate with foreign firms producing very labor-intensive products. After all, it is no secret that our wages can't compare with Western European or American ones. So we are ready to do casting and mechanical treatment to make a joint product. We are already doing this with Siemens, ATT, Schroeder, Magna, Kaiser, etc.

A second way is the scientific-strategic. We could break into the world market with items that it doesn't have. Our scientists from the Institute of Cybernetics and the Japanese have created a new type of computer, a neuro-computer, with billions of operations per second, using super-integrated microcircuits. These are our ideas and Japanese microcircuits, and the result is stunning. We want to organize a company for production of such equipment in Ukraine.

Yet another example. Our scientists have invented and patented a new type of battery, space storage of energy. Automotive models will be ready by the end of the year. At present there exists an automotive storage battery weighting 350 kilograms which will run [a car] for 150 kilometers. Ours will weigh 100 kilograms and is calculated to run 400 kilometers. This is a breakthrough. The world is waiting for it. You see, in Los Angeles, for example, starting in 1996 the use of the gasoline engine will be prohibited. And the first one to create a worthy prototype will win the automotive market. We have proposed to several companies of Japan, the FRG, and the U.S. that we should develop a company together to produce the electric cars. In general, in May and June we are planning to show 50 projects in Tokyo and Seoul, including some on construction materials. We have

excellent inventions in technical ceramics, basalt and carbon materials, and aerospace materials.

In short, in this difficult economic situation, I am a proponent of a creative foundation. Don't destroy everything that was created earlier, but use it to create something new.

[Interviewer] Thanks for the discussion.

Defense Conversion Chief Salo on State Conversion Program

93UM0625A Moscow KRASNAYA ZVEZDA in Russian
5 Jun 93 p 4

[Article by Vladimir Salo, chief, Division of Economics of the Defense Complex and Conversion, Russian Federation Ministry of Economics, and Aleksandr Yegorov: "Life Suggests the Priorities: State Conversion Program Prepared"]

[Text] Analysis of processes occurring in Russian industry since 1988 permits identification of two phases in the conversion of enterprises of the military-industrial complex. They differ in their conditions, depth and the methods of conversion. The first (1989-1991) was based on directive planning methods, under which the list of scarce articles was sometimes imposed from above, without regard for the specialization of the specific production operation. The second (1992), which has no analogues in world experience and which came to be called the "landslide" phase, placed "surplus" plants under the threat of bankruptcy and blue and white collar workers under the threat of lay-off because of sharp reductions in military orders.

In other words in these years our defense industry took bites out of two pies. And from the most bitter pieces at that.

There are a number of causes behind this, to include a still-imperfect market, political instability in the country, absence of the necessary standards and laws governing the functions of the defense complex, and the absence of a clear state conversion program. Work on the latter has only just been completed, and it is attracting high interest among defense workers. But let us begin with where the developers of the program started.

According to the Russian Federation law "On Conversion of Defense Industry in the Russian Federation" the enterprise plays the main role in restructuring production. The state, meantime, can only determine the "rules of the game" and guarantee reasonable financial support and adequate information under the new conditions. The Russian Federation Ministry of Economics is the coordinator of state regulation of and centralized support to enterprises in carrying out conversion. Unfortunately it was not that long ago that the law was adopted, and it was only recently that conversion began acquiring the traits of more or less systematic state activity. Last year we did manage to preserve the basic personnel

potential, and practically stabilize civilian production at the 1991 level. And even experience an increase in production in relation to certain types of goods, chiefly those available to the mass consumer.

Still, it is of course early to say that the problem has been fundamentally solved. A number of shortcomings were revealed in 1992. Primarily delays in financing. Of the 77 billion rubles in loans specifically granted to enterprises to carry out conversion programs, they only received R47 billion, and it was not until the beginning of this year that a number of enterprises received low-interest loans amounting to R30 billion. As a result capacities valued at several tens of billions of rubles were not placed into operation, and the programs became significantly more expensive as a result of abrupt growth of prices.

In this situation the logic of the policy of conversion is seen in transition from economic support to sinking enterprises to specific financing through federal conversion programs.

It was with regard for the conditions under which conversion is proceeding, and the objectives of the Russian economy's restructuring, as well as the particular features of production equipment freed for other uses, that the specific priority programs (subprograms) were developed. All of them—there are 14—will be carried out within the framework of the state conversion program. Written by the Russian Ministry of Economics jointly with the Roskomoboronprom [not further identified; a Russian defense industry committee], the Ministry of Atomic Energy, the Ministry of Finance, the Ministry of Defense and other interested departments, they incorporated the best of 920 projects initiated by the enterprises themselves. The programs foresee loans exclusively to defense enterprises undergoing conversion, in amounts proportional to the depth of conversion. The main priorities are creating import-substituting production operations, developing the export possibilities of the enterprises, assuming an orientation on development and introduction of highly effective energy and resource conserving equipment and procedures, increasing development and production of dual-use equipment, and organizing complex, ecologically clean production operations. The state conversion program is to go on until 1995. It is precisely in this period that the phase of respecializing converted enterprises must basically be completed—that is, the foundation for production of a wide spectrum of civilian products will be laid. A significant proportion of the enterprises must switch to operation on the basis of a self-regulating open economy.

What are the principal directions of the state program?

One of the first is **development of civil aviation equipment**. Specific-purpose financing will make it possible to support production of a new generation of such equipment in the immediate future: An-74T airplanes at the Arsenyev Aviation Association imeni Sazykin, An-38

airplanes at the Novosibirsk Aviation Production Association (APO), and Il-114 airplanes at the Moscow APO imeni Dementyev. Support will be provided to work on new aircraft such as the Tu-204-200 (Kazan APO imeni Gorbunov), T-334 (Taganrog APP [not further identified]), Il-96-300 (Voronezh APO) and An-74 (Omsk Polet Production Association). By as early as 1993 over 500 aircraft are to be supplied to the national economy, including around 170 for export.

The main objective of the **program for rebirth of the Russian fleet** is to organize, in this country, construction of vessels and watercraft that had formerly been supplied by CEMA countries and republics of the Union; to develop the corresponding civilian ship-building complex and replace vessels that had been dropped from the fleet. Loans will be directed at expanding production of civilian vessels of various types, fitted out with modern propulsion, radar and navigation equipment. In particular, loans will be granted to the Krasnoye Sormovo Production Association and the Navashino Oka Ship Building Plant for the construction of dry cargo transporters; loans will also be granted for introduction of capacities for the construction of tankers at the Admiralteyskiye Verfi State Enterprise (St. Petersburg) and of dry cargo transporters at the Sever Production Association (Severodvinsk), the Baltic Plant, the Sredne-Nevskiy Ship Building Plant and the Plant imeni A. M. Gorkiy (Zelenodolsk). Loans will be provided for introduction of capacities for the construction of seiners at the Vladivostok Ship Building Plant and the Svir Ship Building Dock, and for producing fishfinding apparatus at the Taganrog Priboy Plant.

Just this year alone a total of over 370 transport, fishing and auxiliary vessels and watercraft are to be built.

Implementation of the **program for developing production of equipment for the fuel and energy complex** will help to prevent a drop in the level of oil extraction, and to reactivate closed oil wells. Thus a mobile system making it possible to sharply increase extraction of oil from operating wells will be manufactured in 1993 at the Barrikady Plant on the basis of developments of the Institute of Thermal Engineering (Moscow). Over 60 enterprises subject to conversion have begun producing a wide range of equipment for the fuel and energy complex. Capacities for the production of this equipment will be created in 1993 at the Tyumen Ship Building Plant, the Voronezh Machinery Plant, the Burevestnik Electrical Machinery Plant (Gatchina), the Askold Machine Building Plant (Arsenyev), the Krasnoye Sormovo Production Association and the Pella Plant (St. Petersburg).

The **program for creating and developing production of machinery and equipment for housing and road construction** will make it possible to create additional capacities by 1995 to manufacture construction and road equipment amounting to R27.8 billion. Production will be organized at the Arsenal Production Association (St. Petersburg), the Tekhnomash Scientific-Production

Association (Moscow), the Bryansk Road Machinery Plant, the Aleksin Experimental Machinery Plant, the Drobماش Production Association (Vyksa), the Machinery Plant imeni Kalinin (Yekaterinburg), the Kurganskiy Mashzavod Production Association and others.

Over 30 defense enterprises will be working on the **creation and development of production of manufacturing equipment for light industry**. Examples are the Berdsk Electrical Machinery Plant and the Yurginskiy Mashzavod Production Association. Five light industry enterprises that had formerly manufactured products for defense needs have already initiated production of jackets, coats, work clothing, bed linens and other articles for the population.

Production of manufacturing equipment for trade and public food service enterprises will be moved forward by the Volzhskprodmas Production Association, the Marikholodmas Production Association (Ioshkar-Ola), the Sibtenzopribor State Enterprise (Topki, Kemerovo Oblast), the Tulskiy Patronnyy Zavod Production Association, the Arsenal Production Association (St. Petersburg), the Dagdizel Plant (Kaspiysk), the Kovrov affiliate of the Automatic Line Design Office, and a large number of other enterprises.

The ordinary consumer will perhaps be most interested in the **program to develop production and saturate the market with high quality durable goods**. By as early as this year, respecializing of defense enterprises will make it possible to create the conditions for producing highly scarce products amounting to tens of billions of rubles. These include electric and gas ranges, (at the Tula Shtamp Plant, the Izmeritel Plant in Novgorod, the Novovyatsk Machinery Plant and the Progress Plant in Kemerovo, for a total of over 500,000 units), clothes washers (at the Omsk Polet Production Association and the Votkinskiy Zavod Production Association), refrigerators (at the Yuryuzanskiy Mekhanicheskiy Zavod Production Association and the Krasmach Plant in Krasnoyarsk), and others.

Considering the direction in which the population's solvent demand is evolving, special attention will be devoted to increasing production of goods accessible to the mass consumer—from television sets to small tools for private plots.

Catching up in the development of the telephone network (Russia is 27th in the world in relation to the number of telephones per 100 inhabitants) occupies a special place in the **program for development of communication and information resources**. Development of satellite communication and television is foreseen. Productive capacities will be placed into operation by as early as 1993 in Moscow's Ekos Scientific Research Institute, the Lenteplopribor Experimental Plant in St. Petersburg, the Elektropribor Production Association in Penza and the Iskra Production Association in Krasnoyarsk. Capacities

for digital communication systems will also be introduced at the Izhevskiy Radiozavod Production Association. Production will achieve a major scale at the Moscow Measuring Equipment Plant, the Tayfun Instrument Making Plant in Kaluga, the Miass Machine Building Plant, an experimental production operation of the KP [not further identified] Special Design Office in Mytishchi, and the radio equipment plant in Yekaterinburg. There are plans for placing the corresponding capacities into operation at the Binom Production Association in Saratov, the Oktyabr Plant in Tambov, the Pskov Automatic Telephone Exchange Plant, the Lianozovskiy Electrical Machinery Plant and others.

Further development of information services to the society through integrated, stage-by-stage creation and introduction of the necessary equipment for various fields of activity, including banking and tax systems, systems for law enforcement agencies, and systems for various commercial structures is anticipated as a result of the program's implementation.

Over a thousand scientific research and experimental design projects will be carried out within the framework of the program for development and production of new types of medical equipment. All of them must ultimately produce a package of innovative measures for assimilating series production of medical articles. Over 300 enterprises and scientific organizations will take part in this work. Among them are the Oktava Production Association (Tula), which is organizing production of various modifications of competitive hearing aids out of Russian-made components jointly with the Istok GNPP [not further identified] (Fryazino); the Kazan Experimental Machinery Plant—opto-electronic instruments for medicine; the St. Petersburg Severnyy Plant—surgical instruments; Elektropribor (Penza) and the Optika Scientific-Production Association (Moscow)—medical laser apparatus; the plant of the Scientific Research Institute of Apparatus and Instrument Making in Moscow—apparatus for artificial circulation and surgical monitoring for open-heart surgery, etc. Measures are being implemented to organize production of lung ventilating apparatus at the Korpus Production Association (Saratov), electrographs and defibrillators at the Izhevsk Motor Plant, children's resuscitation systems at the Dagestan Electrical Machine Building Association, and computer-assisted tomographs at the Tomsk Instrument Plant.

Sizable loans are also being allocated to programs for developing production of a system of machinery and equipment for the timber industry complex; to processing sectors of the agroindustrial complex; to development of electronics; to conversion of enterprises of the Russian Ministry of Atomic Industry; to the "Conversion for Ecology" program. These programs will be carried out by hundreds of enterprises of the defense complex.

But what does this ultimately provide to defense enterprises?

Special allocations are foreseen in 1993 for the retraining and cross-training of workers laid off from military production, for maintaining facilities of the social infrastructure and unique equipment of the scientific research institutes and design offices, and for financing civilian scientific research and experimental design work.

As a result of restructuring, the proportion of civilian products in the total production volume of the defense complex will increase to 76 percent in 1993 (in 1998, prior to conversion, it was 46.2 percent, it was 70 percent in 1991, and 74 percent in 1992).

Implementation of conversion programs at different levels (enterprise, region, national economy) will have a favorable effect upon the development of the country's entire economy. Primarily in the aspect of solving the problems of the population's employment by creating additional jobs in the civilian production sphere and promoting social development of a number of regions that had formerly specialized in defense production.

Development of the corresponding legal standards that would make it possible not only to implement the law of the Russian Federation "On Conversion of Defense Industry in the Russian Federation" but also establish normal conditions for operation of enterprises in the defense sectors of industry in subsequent years is foreseen.

DEFENSE INDUSTRY AND CONVERSION: GENERAL ISSUES

MIC Defense Production Down by Half, Civilian Production Up 9 Percent

93UM0592A Moscow VESTNIK STATISTIKI
in Russian No 12, 92 p 46

[Unattributed article: "Conversion of Military Production"]

[Text] Russian Federation Goskomstat [State Committee for Statistics] has conducted research of the course of the conversion of military production to study the development of conversion processes in industry.

At the present time, conversion is being carried out at more than 600 defense complex enterprises. The results of the research conducted attest to the expansion of the conversion process and substantial progress in enterprises' production programs toward the production of civilian output. So, if in 1990 the share of defense output in the total volume of the military-industrial complex enterprises studied totaled 51%, in 1991 it was reduced to 44% and, based upon 1992's results, this share will total 26% according to research assessments. Based upon the enterprises' forecasts, in 1992, in contrast to 1991, the output of military products will be reduced by a factor of two with an increase of civilian output of only

9% which does not compensate for the decline of the total volume of production which will total 18% at the enterprises studied.

As a result of conversion, practically every other worker will be released from defense production. Of the 877,000 released workers, 536,000 will find jobs in civilian plants of these same enterprises. Over 300,000 people will be compelled to augment the labor market.

During the course of conversion, a large portion (54%) of those released from primary resource defense plants are being retrained for production of civilian goods. However, research showed that the share of retraining funds in the total cost of released funds is being reduced at a time when the share of funds that are going to conversion is growing.

Total expenditures for the implementation of the conversion of military production, according to the assessments of the enterprises, will increase by a factor of 23 in 1992 as opposed to 1991. They propose carrying out the expenditures largely at the expense of state budget resources. The share of centralized sources of financing is over half of the total expenditures.

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Civilian Products from Ukrainian Defense Plants

93UM0564A Moscow DELOVOY MIR in Russian
11 Dec 92 p 7

[Article by the Southern Ukrainian Journalist Agency: "Ukrainian Military Plants Will Produce Civilian Products"]

[Text] Despite the shortage of funds in Ukraine's state budget, conversion processes are gathering speed. Some 500 specific-purpose scientific and technical programs have been developed with overall financing of more than 550 billion rubles [R]. In eight months of this year, the output of civilian products and consumer goods at enterprises of Ukraine's defense complex increased R31.3 billion in current prices. During the first six-month period of 1992, compared to a similar period last year, the output of various types of radio receivers, video tape recorders, appliances, and glassware increased on the whole for 7 out of 22 positions.

Today, the Southern Ukrainian Journalist Agency [YuZhA] DELOVOY MIR acquaints you with 31 of the 500 conversion programs developed by the Ministry of Engineering, Defense Industrial Complex, and Conversion and planned up to 1996.

Conversion Programs

Program Name	Enterprise and Executive Organization	Name of Programmed Work and Products
1. Special aviation program	Aviation Scientific and Technical Complex imeni Antonov, Kiev	Aircraft, engines, other equipment
2. Comprehensive program "Ships and Vessels"	"Shipyard imeni 61st Kommunar" Production Association [PO], Nikolayev	Ships, vessels, other equipment
3. Development and introduction of household electronic equipment	"Ukradiotekhnika" [Ukraine Electronic Equipment] Association	Household electronic equipment
4. Designing and development of "Meditsina" medical equipment	"Mioritm" Scientific Research Center, Kiev	Equipment for functional diagnostics
5. Development and production of new types of products	PO imeni Korolev, Kiev	Appliances and other consumer goods
6. Program for developing export products	PO "More", Feodosiya	Passenger hydrofoil motor ships
7. Program for producing equipment for the State Food Industry Committee of Ukraine	"Almaz" Plant, Kiev	Equipment for creating plants for production of candied peels, starch, and carotene
8. Development of "Svyaz" radio communications equipment	"Dneprovskoye" Design Bureau	Radio relay and telephone exchanges
9. Artificial kidney	"Almaz" Plant, Kiev	Artificial kidney
10. Production of electronic hearing aids	"Vympe!" Plant, Yevpatoriya	Hearing aids
11. Comprehensive program for creating air conditioning and refrigeration equipment	"Tayfun" Ukrainian Scientific Research and Planning Institute [UNIP], Nikolayev	Air conditioning and refrigeration equipment
12. Developing production of component base for electrical connectors, communications products, and base units of television and video equipment	"Ltava" PO, Poltava	Component parts and consumer goods
13. Development and production of "Rezistor-92" resistors	Karlovskiy Mechanical Plant, "Pridneprovskiy khimzavod" [Dnieper Chemical Plant], Dneprodzerzhinsk	Tanks, filters, pumps, reservoirs
14. Creating and organizing series production of automated control systems for transportation facilities and oil refineries	"Kharton" Scientific Production Association [NPO], "Elektropribor" Plant, "Kommunar" PO, Kharkov	System control equipment and instruments, assemblies for transportation facilities and refineries

Conversion Programs (Continued)		
Program Name	Enterprise and Executive Organization	Name of Programmed Work and Products
15. Organizing series production of equipment for the food industry	PO imeni Artem, Kiev	Automated lines for baking ice-cream cups, bottling nonalcoholic beverages, and others
16. Program for conversion of military production of the KZA imeni Petrovskiy	Kiev Automation Plant imeni Petrovskiy	Equipment and machines for the agroindustrial complex, sewing industry navigation, medical equipment, and consumer goods
17. Developing and setting up series production of a complex of medical instruments and systems for functional diagnosis of people	Scientific Research Technological Institute of Instrument Building, Kharkov, about 15 co-performers	Complex of medical instruments and systems for functional diagnosis of people
18. Developing and producing "Ukrainian Television" televisions	Concern "Elektron", Lvov	Televisions and component parts
19. Purpose-oriented and comprehensive program for improving maritime machine building for Ukraine's shipbuilding enterprises	Ukrainian Scientific Research Institute of Maritime Machine Building, Nikolayev	Improving billet production facilities, boiler production, and metalworking tools
20. Comprehensive system for processing milk and waste-free production of ecologically pure whole-milk and canned-milk products	Scientific Research Technological Institute of Instrument Building, Technological Institute of the Meat and Dairy Industry, Kharkov	Complex of automation technical equipment for milk processing
21. Creating and producing radio equipment for water and emergency lifesaving and safety equipment	"Mussou" Concern, Sevastopol	Emergency rescue radio buoys and search and rescue equipment
22. Creating complex electronic toys	NPP "Poisk", Zheltyye Vody, Dnepropetrovsk Oblast	Complex electronic toys
23. Creating and organizing series production of a complex of technical equipment for equipping subways	NPO "Khariton", Kharkov Subway, "Elektropribor" Plant, Kiev	Complex of technical equipment for equipping subways
24. Developing and introducing into series production thermoelectric automotive refrigerators	"Kvarts" PO, "Ritm" Central Design Bureau [TsKB], Chernovtsy	Thermoelectric automotive refrigerators
25. Creating a light crop-spraying aircraft	"Tayfun" Design Bureau, Novomoskovsk, Dnepropetrovsk Oblast	Light crop-spraying aircraft
26. Program of work for creating advanced technologies and equipment for decorative coating of window glass	"Orgtekhavtomatizatsiya", Simferopol	Advanced technologies for decorative coating of window glass
27. Creating radiotelegraph communications equipment for rural areas	PO imeni Korolev, Kiev	Telegraph communications equipment for the rural area
28. Fine filters for gasoline engines	Donetsk Plant of Rubber and Chemical Products	Filters for gasoline engines
29. Developing and introducing into production modulation flame sensors for fire detection in national economic facilities	"Kvarts" PO, "Ritm" TsKB, Chernovtsy	Modulation flame sensors for fire detection
30. Research and development of software and hardware for a 1st class microprocessor multifunctional telephone set	"Rodon" Concern, Ivano-Frankovsk	Software and hardware for microprocessor multifunctional telephone set
31. Improving and developing production of household appliances	"Vesta" KNPO, Kiev	Developing production of refrigerators and freezers

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Uralsk Oblast To Allot Budget for Conversion Program

934E0686A Yekaterinburg *URALSKIY RABOCHIY* in Russian 31 Mar 93 p 2

[Article by Ye. Vladykin, under rubric "Conversion": "The Iron Met the Pistol"]

[Text] A total of 3.8 billion rubles will be allocated from the oblast budget for providing preferential credit to conversion programs. An expert commission operating under the oblast administrative office has approved a list of 250 long-range elaborations which these funds will support.

URALSKIY RABOCHIY already reported on 23 March concerning the conversion programs for the Urals VPK [military-industrial complex] that are aimed at producing medical technology and that have been approved by the oblast's Main Administration of Public Health. Apart from this, the efforts of the defense enterprises are concentrated in several important areas: the production of equipment for the agroindustry; transportation, and communication; the production of TNP [consumer goods]; and advanced scientific research and development.

Thus, the Vektor PO [Production Association] plans to assimilate the production of color television sets, initially according to a "screwdriver" technological scheme, from parts made in Singapore and Hongkong, and then changing over to the use of domestically produced components. With a consideration of the fact that the Urals Electrical Engineering Plant plans the mass production of modern picture tubes, this idea seems to be completely realistic. Other plans include washing machines, knitting machines, kitchen appliances, vacuum cleaners, microwave ovens, irons, woodworking lathes, household water meters, sets of furniture, sets of chinaware, and even gas-powered pistols. The Yegorshin Radio Plant plans to produce UKV [ultra short wave] radio sets for the militia and radio attenuators for telephone lines to remote populated places. The Yekaterinburg Radio Apparatus Plant plans to produce telephone concentrators that are currently scarce. The Korpus NPO [Scientific Production Association], the Nizhniy Tagil Chemical Plant, and the Series Machinery Plant of Uralmash AO [Joint-Stock Company] will engage in the production of spare parts for urban transportation. Any discussion of conversion plans to help the rural areas would require a separate newspaper article. These plans include small-scale mechanization; processing lines; and transportation equipment.

Business plans are being prepared in parallel, for discussion at the Ministry of Economics and the State Committee for Questions Pertaining to the Defense Branches. In the opinion of the people in the Urals, some of the conversion programs (the production of those same picture tubes, as well as mini-tractors and thermocontainers) are of importance for the entire Russian Federation and must be financed through the federal budget, from which 400 billion rubles will be specially allocated for conversion.

Possibly the Urals defense manufacturers will be able to discuss many of their plans at the Conversion-93 exhibition that is supposed to take place in Yekaterinburg on 21-27 April.

Floating Nuclear Powered Distillation Facility

93UM0566A Moscow *MORSKOY FLOT* in Russian No 4/5, 92 pp 26-29

[Article by D. Klykov, V. Kovalenko, and V. Polunichev, under the rubric: "Science and Technology": "Floating Nuclear Water Distillation Facility"]

[Text] A shortage of distilled water in many regions of the world and the lack or scarcity of it in areas that are rich with natural resources and the prospects for their exploration have set the quite urgent task of artificially producing fresh water. Aggressive scientific research and experimental design work in the sphere of distillation has been conducted in the United States, the USSR, England, Spain, Italy, Japan and other countries since the end of the 1950's.

Unlimited supplies of sea water in regions that are adjacent to the sea and that have a shortage of fresh water afford the opportunity to provide them with a practically full-fledged supply of fresh water through the utilization of sea water distillation technology.

Right now distillation plants with a capacity of up to 26,000-33,000 m³ per day are being placed on the market and plants with a capacity of up to 42,000-45,000 m³ per day are appearing. Among them, preference is being given to plants with horizontal pipe film-type boilers that have good economic indicators and are simple to operate and maintain. The distillation facility in Shevchenko is equipped with those plants with a capacity of up to 16,800 m³ per day. Ashdod (Israel) has the largest plant of this type with a capacity of up to 20,000 m³ per day.

At the present time, energy obtained from the combustion of organic fuel is utilized to operate practically all distillation plants. The only example of the successful utilization of nuclear energy fuel for this purpose is the nuclear distillation complex at Shevchenko that has been operating since 1973. Nuclear fuel is the ecologically cleanest form of energy and its employment is most advisable for large distillation plants.

Large distillation plants are located, as a rule, on the sea shore near the consumers.

While considering that our country has the unique experience of operating nuclear reactors on nuclear ice breakers and positive experience of operation of distillation plants as part of a nuclear distillation complex, the task of developing a floating nuclear distillation facility based on completed solutions is highly promising and completely realistic.

The completed design of the APVS-40 floating nuclear distillation facility envisions supplying fresh water of the coastal areas of the Mediterranean Sea, although it can be used in other areas of the world.

The facility is a special non-self-propelled ship on which are installed: a nuclear steam-generating plant (YaPPU), and steam turbine and distillation plants that also service all ship systems. The primary energy source—the heightened safety nuclear steam-generating plant—is similar to plants that are operating on our nuclear icebreakers that have operated accident-free for many years. The facility's distillation plant is similar to plants that are successfully operating in Shevchenko.

The facility's lay-out diagram concept is based on the rationality of functional ties, the relative positions of the block of compartments, ensuring the maximum survivability of the nuclear reactor and the heightened reliability of operation of the systems that are associated with distillation, and the optimal location of the living quarters unit and the relaxation area for servicing personnel.

Proceeding from that, the central energy compartment (TsEO) with the nuclear steam-generating plant and the block of compartments for servicing systems is located in the central portion of the facility. The machine rooms, in which the main turbo generators with the servicing mechanisms and systems, auxiliary diesel generators, technological condensers, electrical equipment, ship systems, and also the perocondensation cycle and intermediate cooling loop systems, are located forward and aft of the central energy compartment.

Primary Specifications of the Facility

Length, in meters	160
Width, in meters	32
Draft, in meters	6
Height of the side, in meters	10
Total displacement, in tonnes	28,500
Fresh water capacity, in m ³ per day	40,000
Total service period, in years	25
Number of reactors	1-2
Number of water distillation systems	2
Duration of operation without replacing the reactor's fuel, in years	3-5
Number of personnel	60

Independent auxiliary plants, emergency diesel generators, the central control station (TsPU), the nuclear steam-generating plant emergency reactor shut-down cooling station (PAR), laboratories, automation and radiation monitoring services compartments, and store-rooms are located over the machine rooms. Distilled water units with storage for placement of the required amount of chemical reagents are located forward and aft of the machine rooms. Positioning of the distillation

plants' condensers has been carried out on open platforms to ensure the effective discharge of heat into the environment.

Primary Specifications of the Reactor Core

Thermal capacity, in MVt	approximately 80
Time until recharging, in years	2.5
Maximum energy release rate, in MVt/m	approximately 74
Number of TVS [fuel assemblies]	241
Fuel Composition	NO ₂
Uranium load, in tonnes	1.8
Enrichment of uranium isotope U-235, in percentages	8.5 and 10

The ecological compartment, living quarters, rest area, medical and health compartments, and cooking and dining compartments are located in the facility's forward end. A pad for the aperiodic reception of a helicopter with a landing weight of approximately 12 tonnes with a flight support servicing system complex has been organized in the facility's aft section over the distillation unit.

The facility's hull is entirely welded and has the shape of a straight angle pontoon with small undercuts in the aft and forward ends.

The number of servicing personnel who directly participate in continuous operation is approximately 60 people. Quarters for additional personnel have been provided for: 15 trainees and 10 inspectors or visitors.

The reactor plant (RU) is the primary source of energy on the ship and consists of the nuclear steam-generating plant with safety servicing systems. The experience of the many years of operation under extremely difficult conditions of Soviet nuclear icebreakers with the similar KLT-40 nuclear steam-generating plant has been laid at the foundation of its design. At the same time, international experience and the trends toward increased safety of nuclear power plants were taken into account. The reactor plant's level of safety totally meets domestic and international standards for shipborne nuclear power plants and considers the requirements for the level of safety of future fixed reactors and IAEA [International Atomic Energy Agency] contemporary requirements.

The reactor core—the primary source of heat—can operate continuously in specific modes with stoppages without restriction of the number of start-ups.

Smooth rod TVELs [fuel elements] with a 9.1 mm diameter with a sheath of a zirconium alloy that are filled with fuel in the form of pellets from baked low-enriched uranium dioxide are used in the TVS [fuel assemblies]. The design and technology of fuel assembly and fuel element manufacture have been worked out well and the reliability of fuel element operation has been confirmed through the prolonged operation of similar fuel elements.

All sources of radiation have been surrounded with biological shielding that guarantees the safety of personnel and the population and the absence of an impact on the environment. Steel, concrete and water are utilized as biological shielding materials.

The nuclear steam generating plant and all of the equipment in which there is a radioactive medium are enclosed in a sealed protective sheath (ZO) which is a cylindrically-shaped structure. Ventilation of the protective sheath is carried out through a closed cycle.

Besides the nuclear steam-generating plant equipment, the systems that service it are located in the protective sheath which reduces the probability of contamination of the environment to a minimum. By height, the protective sheath is divided into three compartments: the nuclear steam-generating plant proper (the subunit space), the device space (the lower compartment) and the recharging compartment. The protective sheath is designed for the pressure that can arise in it in the event of a maximum diameter total cross-section rupture of a first circuit pipe.

From the exterior, the protective sheath is surrounded by a protective barrier which, jointly with the ship structures, ensures protection of the reactor plant from external effects.

The second circuit has been designed to provide feed water to the steam generator (PG), to process superheated steam of assigned parameters in the steam generator, and to discharge superheated steam from the steam generator into the turbo generator plant.

The steam-generating capacity of the second circuit is 125 tonnes per hour, the pressure of the superheated steam under rated capacity is 4 MPa [megapascal's], the temperature of the superheated steam under rated capacity is 300°C, and the temperature of the feed water under rated capacity is 150°C. The second circuit consists of two loops, each of which is connected to the turbo generator plant (TGU) with condensate pumps and a common feed pipe with feed pumps.

The turbo generator plant is designed to receive steam from the nuclear steam-generating plant's steam generators, generate electrical energy for the facility's own needs and transmit thermal energy to the intermediate circuit. The expenditure of turbo generator plant steam to the turbine is approximately 62 tonnes per hour, the electrical output with rated parameters and expenditures of steam is 35 MVt, the condenser's thermal capacity is 35 MVt and the pressure in the condenser is 0.5 MPa. Each of the two turbo generator plants consists of a steam turbine, an electrical generator, a condenser, a reduction device and servicing systems and devices.

The intermediate circuit is designed to receive the transfer of thermal energy from the turbo generator plant condensers to the fresh water distillation plant's (DOU) steam generators. It has a pressure of 1 MPa in the circuit, the temperature of the hot branch is 140°C and

the temperature of the cold branch is 125°C. The intermediate circuit is autonomous for each turbo generator plant and consists of primary and reserve pumps, pressure compensators, pipes and armature. Overpressure that exceeds the pressure in the turbo generator plant's condenser is maintained in the intermediate circuit which totally excludes the entry of radioactivity into the intermediate circuit in the event of a leak in the nuclear steam-generating plant steam generator.

Auxiliary plants consist of auxiliary boilers, the nuclear steam-generating plant's distillation plants, and low pressure steam generators.

Two GTPA-840 distilled fresh water equipment units with horizontal-pipe film-type boilers are used as distillation plants. The unit's capacity is 20,000 m³ per day and the unit's thermal energy consumption is 35 MVt.

Sea (source) water has a mass salt concentration of 42.5 grams per liter and its expenditure totals 3,000 m³ per hour and a calculated temperature of 16-27°C.

The distilled water has a mass salt concentration of 20 milligrams per liter and a temperature of 32°C (with a seawater temperature of 27°C).

The drinking water preparation plant (UPPV-40) is designed for the preparation of drinking water from distilled water obtained from the distiller. It consists of two units with a capacity of up to 20,000 m³ per day. The unit's power consumption is 0.7 MVt.

The qualitative indicators of the drinking water obtained are: salt content 25-50 milligrams per liter, hydrogen indicator 6.5-8.5, and calcium content 85 milligrams per liter.

Filtration-reagent technology that ensures receipt of calcium group carbonated class drinking water from distilled water was laid at the foundation of the UPPV-40's technological system. The drinking water obtained is distinguished by its high quality, it is physiologically valuable with a minimal content of sodium, chlorides, and sulfates and it corresponds to World Health Organization requirements.

The UPPV-40 can be located both on a ship and on a coastal site.

The second variation is preferable because it permits significantly simpler construction and operation to be carried out based upon the developed technology.

The adopted structural construction of the electrical supply system ensures the principle of autonomous operation of the two generation plants in any of the facility's operating conditions.

The feed circuit's electrical energy quality meets USSR Register requirements.

In the event of the total disconnection of the facility's monitoring instruments and indicators that are connected to sections of the emergency distribution panels, they obtain electrical power from batteries through the appropriate inverters.

Control of the facility's entire complex of technical systems is carried out from the central control station, without continuous local watches, from the control panels and panels on which the operational control, monitoring and signaling organs, digital panels and summoning units, and displays with keyboards are located. Stopping the reactor and its shut-down cooling when the central control station malfunctions is carried out from the emergency reactor shut-down cooling station.

The facility is equipped with an entire complex of ship-wide and routine support systems, communications systems at the level of requirements of normative documents for this type of ship.

Radiation safety of the floating nuclear distillation facility is attained through design, technological and organizational solutions that are directed at limiting to the maximum extent possible (lower than maximum limits) or to exclude a leak or seepage of radioactive substances, including penetrating radioactive radiation both outside the YaPPU and in the facility as a whole.

The many years of experience of nuclear icebreaker operations attest that the average doses for personnel do not exceed 0.5 rems per year and the radiation effect on the population and the environment should not make an appreciable contribution to natural background radiation levels.

The presence of safety barriers and localizing systems practically totally excludes the discharge of radioactivity outside the facility in the most serious rated accidents. The proper selection of construction materials and the technology for obtaining distilled water excludes the transfer and harmful impact of copper and iron ions to sea fauna which makes the operation of the distillation facility ecologically clean. With regard to the small quantity of heat that is discharged during operation of the facility, it cannot play a substantial role in the ecology of the basing area.

The ecological unit on the facility, that ensures cleaning and processing of waters containing sewage and petroleum and also the collection, processing and removal of food waste and hard garbage, permits maintenance of the ecological cleanliness of its basing area.

We propose construction of the floating nuclear distillation facility at "Baltiyskiy zavod" [Baltic Plant] PO [Production Association] which has a great deal of experience in building ships with nuclear power plants and also the required level of technical equipment to develop such structures. Subsequent tests after construction of the facility that are conducted by the plant-builder will serve as a guarantee of its future reliable operation.

A breakwater, a facility shoring system, engineering lines and a port-shelter for support ships must be part of the basing site's hydraulic engineering structures.

Maintenance in operating condition of the entire complex of equipment for the production of drinking water and the facility as a whole is ensured by a technical servicing system. Facility maintenance includes the following primary operations: delivery and replenishment of consumable materials, supply, spare parts, etc., preventive maintenance and minor routine maintenance, recharging the reactor's nuclear fuel, replacement of equipment that is worn out, and personnel training.

The frequency of delivery and replenishment of consumable materials, including provisions, is determined by their reserves on the ship and is from one month to one year.

The conduct of preventive maintenance work for maintaining the facility's systems and equipment in operating condition until its service life has ended and also their minor routine maintenance is conducted by servicing personnel during the facility's operation and also during planned stoppages.

The nuclear fuel recharging technology has been developed on nuclear icebreakers using the "Imandra" floating self-propelled recharging facility. It can be carried out both at the facility's basing site and also at "Atomflot" Repair-Technological Enterprise (RTP) in Murmansk after the floating facility has been delivered there.

While considering the entire complex of technical, economic, legal and organizational issues, nuclear fuel recharging at the facility's basing site using our technical servicing men and equipment is the preferred method.

The primary equipment and systems that have worn out prior to expiration of the facility's service life are replaced once in 12.5 years during the period of plant repair by RTP men and equipment after the delivery of the floating facility to the RTP. The total term of replacement with the restoration of the facility's operating capability will not exceed one year.

Cadre training for the APVS-40, both from native specialists and from citizens of the customer country, can be provided by the sector training-simulator center that is located in Saint Petersburg and by GMA [not found] imeni Admiral S.O. Makarov that have specialized in training and retraining personnel for nuclear icebreakers.

After completion of the term of service, the floating nuclear distillation facility is removed from operation and transported to the burial site.

The design of the nuclear plant permits its dismantlement and removal of the primary radioactive equipment and pipes as a single large unit with placement for extraction to a special storage area and with subsequent stripping and decontamination of low active structures and scrapping them.

Highly active structures and equipment are subject to final burial in special sarcophagi. The non-radioactive ship structures that have remained after the nuclear plant has been hauled away are subject to dismantlement, stripping and reprocessing as ordinary materials.

Based upon its safety level and ecological cleanliness, the APVS-40 meets domestic and international standards that eliminate any restrictions whatsoever for its location near populated areas. The decisions made for the reactor plant, are in accordance with the safety concept for low and medium powered reactors that have been reviewed by IAEA.

Similar questions have been successfully resolved for nuclear icebreakers, however, the creation of a specialized organizational structure that would permit the unification of the financial, technical and production capabilities of the primary participants on a purely economic basis, as is customary throughout the entire world, is needed for their resolution with regard to the APVS-40 under conditions of a decentralized market economy.

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EC, U.S. Aid in Defense Conversion, Arms Dismantlement

93WC0067A Moscow *KOMMERSANT-DAILY*
in Russian 29 Apr 93 p 10

[Article by Anastasiya Romashkevich: "America Has Presented Russia a Gift of 'Armored Blankets'—Help from the West in Russian Conversion"]

[Text] Issues with respect to assisting in the conversion of Russian industry are being discussed at the session of the Europarlament which opened yesterday in Brussels. Attention here is focused on two questions—"Practical Proposals on Military Conversion East—West" and "Assistance Instead of Weapons." The Russian delegation to the session is headed by Vice Premier Georgiy Khizha. In spite of the declared readiness of the European Community [EC] Commission to afford Russia significant financial assistance for conversion of its military-industrial complex, it is not ruled out that assistance in the near future might be expected all the same from the United States.

During the course of preparation for the current session, Fred Catherwood, vice president of the conversion department of the EC Commission, visited Moscow and laid out the EC Commission position on assistance to Russia in the sphere of conversion (see *KOMMERSANT-DAILY* dated 18 March). In his opinion, a long-term program of assistance to Russia's conversion effort in the amount of \$15 billion would be the minimum necessary to ensure the success of conversion on the whole. However, the EC Commission is presently not in any rush to allocate funds. Russia can count on receiving just \$1 billion in 1993 in the form of credits (although Catherwood mentioned the possibility of extending another \$5 billion). For the time being, the EC Commission intends to continue rendering

active technical assistance unconditionally. This must be supplemented by joint enterprises which are being established, the conversion department of the EC Commission believes. True, it is difficult to judge just how quickly the idea of joint enterprises will catch on, considering the low degree of interest shown by the West in investing in Russia. As far as technical assistance coming from the EC Commission is concerned, this has suffered up until now from a certain bureaucratization, in the opinion of certain Russian experts. Business has often been limited to the allocation of an initial contribution amount—insignificant as compared with the total amount promised, after which the structures of technical assistance have begun functioning according to the well-known "Parkinson's Law," monies being spent to inspect their utilization.

But Russia's hopes for assistance in conversion are tied not only to the EC Commission, but to the United States as well, where more attention is being presently devoted not to conversion on the whole, but to furthering the destruction of arms inventories, nuclear arms first and foremost. According to the Nunn-Lugar law, up to \$400 million is expected to be allocated to Russia for nuclear dismantlement programs. A report from the U.S. Department of Defense disseminated yesterday states that Russian and American specialists have completed development of a first series of special containers for storing nuclear materials. It was also announced that deliveries to Russia have begun of special "armored blankets" for providing security during the dismantling and transportation of nuclear warheads. The first batch of 684 units was shipped to Russia on 26 April.

As far as conversion is directly concerned, the concept is still being developed. In particular, a theoretical treatise of this "delicate issue" by Stanford University's Center for Security Problems (in California) states that "Russian conversion is the business of the Russians themselves," but its successful realization is in the interests of the United States. Guided by the first thesis, in the opinion of the California experts, the United States should not strive towards "resolving the conversion problem in a package," being oriented only on the creation of "representative models." In this regard, technical assistance must precede the credits promised Russia by international financial organizations so that these funds arrive where the groundwork has already been prepared. Thus, if the American government heeds this advice, they will have to tie in their plans with the International Monetary Fund, International Bank for Reconstruction and Development, and European Bank for Reconstruction and Development.

[begin boxed portion] Recommendations of the Stanford University Center on Problems of Security and Arms Control with respect to conversion in Russia:

—assets of government technical assistance should be distributed as much as possible among private organizations (nongovernmental organizations can operate more quickly and flexibly than the governmental bureaucracy);

- a significant portion of assistance programs should be focused on the level of individual enterprises;
- the United States Government must create a small business fund (modeled after similar programs in Poland and Hungary);
- U.S. companies should conduct business directly with Russian enterprises, and not attempt to operate through the government;
- investments in conversion enterprises must be designed for the long term.[end box]

Defense Industry Seen as Potential Energy Producer

934F0705A Moscow ROSSIYSKIYE VESTI in Russian
2 Jun 93 p 4

[Article by Pavel Veselov: The Unlit Sky Is Brighter: "The MIC's Potential for Energy Conservation"]

[Text] Russia and nearby foreign countries have remained the only countries in the world where flares, that burn products that accompany oil production, emit smoke into their skies. Even at midnight the sky over Bashkiriya, Tatariya, Kazakhstan and Western Siberia is lit from these "symbols" of mismanagement. Hundreds of billions of cubic meters of casing-head gas and gas condensate are burned annually at oil fields and at refining and chemical enterprises.

Meanwhile, this raw material is no less valuable than oil itself, the production of which has been steadily declining recently. The oil industry is constantly threatened by ecological disasters. The small stream of petrodollars is becoming ever smaller... If we finally extinguish the flares that are destroying the earth and we revive abandoned and unprofitable oil wells, this will give us the opportunity to increase the production of just high octane gasoline alone by 20-25 million tonnes per year. Add other petroleum products. For example, it is far more profitable to obtain food paraffin instead of gasoline from high-paraffin oil and its case-head gas and condensate, even the highest quality, when there is a shortage of paraffin even on the world market.

The intentions of transforming wastes into profits are not new. But even now, when the energy crisis is in full swing, we continue to burn raw materials for the production of hundreds of thousands of tonnes of gasoline, aviation oils, diesel fuel, and oligomers. We also have domestically produced equipment that can rapidly and effectively recover and reprocess oil drilling wastes directly at the oil fields. Test models that don't yield anything to similar world models have already been operating for the last couple of years at oil drilling locations while supplying oil worker regions with full-fledged gasoline. But that is only a drop in the bucket.

The need for these mini-plants is especially great in inaccessible locations or those with small supplies of raw

materials where it is unprofitable to lay an oil pipeline. It is easy to deliver a small plant weighing 7-12 tonnes by helicopter or on a KamAZ truck bed. But those same small tonnage plants, like air, are also needed there where they are exploring future oil fields, for example, Yamal, KATEK [Kuybyshev Automobile and Tractor Electrical Equipment and Carburetor Plant], and even the sea shelf. To have fuel that you have produced yourself is always more profitable than fuel that is transported from the center.

Siberian farmers have their own views on that score: they are not averse to getting rich to an American tune while pumping oil for their own ranches. Many people, on whose soil have turned out to be unproductive and unprofitable wells, are thinking about an oil pump and a processing mini-plant. Well, the farmers are entirely capable of realizing their idea in a skladchina [small fold]: one plant is quite sufficient to provide fuel to an entire agricultural rayon.

I think that in potential the total extractable reserves of raw material that are not subject to collection and delivery to petroleum refining plants for reasons of the remoteness of drilling sites and due to the lack of reliable transportation lines is: gas condensate—700-750 billion tons; oil gas condensate in Western Siberia alone—more than 1.5 billion tons. These expensive natural resources that are not being processed is nothing other than a waste of appropriations. And if that in fact occurred we would be able to create interindustry structures which would connect technologically related enterprises—from the well to the gas pump—on the territory of the CIS with minimal capital investments, excluding the laying of an expensive oil pipeline.

These prospects of truly state importance so far remain dreams and designs. Why?

Demand for the mini-plants strongly outpaces supply: there are many sources, reserves and raw material resources for them. In the next one-two years alone, as the research of developers from Bashkir State University attests, the need for low-tonnage plants for processing gas condensate will total 130 and for oil-gas condensate—260. No less than 150 plants are needed for processing oil of small remote fields that are spread out on 270 deposits, the reserves of which number 2.5 billion tonnes.

But no matter how hard the developers think about low-tonnage plants, where can they obtain finances, while convincing the commercial structures of the profit of their projects (say, one plant worth 150 million rubles is capable of generating a profit of several billion rubles), it's obvious that private individuals and private organizations alone cannot deal even with a tiny bit of the previously indicated "order".

We can't get by without the organization of series production, all the more so that spare parts will be needed and the question will be raised on the creation of auxiliary production, etc.

Creation of a mini-industry for the petroleum refining industry is precisely what the former MIC [Military-Industry Complex] structures could handle. The Military-Industrial Investment Company and certain structures that have developed based on the former Ministry of the Defense Industry have already become seriously interested in this idea. Of course, their activities would prevent the attempt to acquire similar equipment abroad which would cost too much.

It would seem that the process has proceeded: the matter has progressed, however, no matter how many interested parties have been added to the "maker-customer-performer" chain, complexities in extinguishing the burning flares are not abating.

The primary question is: who will assume the organizing role? As it turned out, more than 10 designs of block-modular small plants have been introduced in the alternative types of fuels program alone according to Ministry of Energy policy. But the kpd [efficiency] of which mini-plants is higher will be difficult to answer right now in the ministry.

The weak links of the previously mentioned chain were revealed at the interindustry conference on the problems of the participation of converted enterprises in the series mastery of low-tonnage plants that occurred in Ufa under the chairmanship of Expert Council under the Russian Federation President Deputy Chairman Pilot-Cosmonaut G. Titov and Russian Center for the Conversion of the Aerospace Complex First Vice President V. Voytyuk. The process is being drastically impeded due to the orientation on the technology for obtaining motor fuels using zeolite catalyzers. The latter have proven themselves only under plant conditions where the modes for supplying hydrogen and maintaining high temperatures have been adjusted and where they are not concerned with regard to the low operating periods of these catalyzers until regeneration.

Field conditions and impassable terrain are another matter... And of course the fact that the "Sintez" Inter-Economic Scientific Production Association design that envisions the employment of a fundamentally different type of catalyzer is absent in that same Ministry of Energy program causes doubt among the future manufacturers. Scientists of this association and Bashkir State University invented it. Not in the example of its predecessors, this catalyzer is easily accessible, cheap, and the main thing, participates in the chemical processes and in petroleum refining at atmospheric pressure and comparatively low temperatures, without the labor-intensive and dangerous supply of hydrogen. It doesn't have a period of operation until regeneration of 360 hours like the zeolite catalyzers, but no less than 1.5 years. What about the field version? Moreover, a fundamentally new petroleum refining reactor which is utilized in the plant has been developed and introduced into industry by Sintez.

The catalyzer has undergone testing on experimental low-tonnage plants and petroleum processing plants and the

developers have already set up series production—it is in production right now. Let's add that the association's pilot plants are highly effective in operation. The portfolio of its orders is full—their production is awaited at the oil fields of Nizhnevartovsk, Bashkiriya, Stavropol, and Kaliningrad Oblast. Rusneftegazstroy Joint Stock Company and many commercial structures that have obtained a land allotment have that same interest.

And yet the Sintez mini-plant project can in no way penetrate through the Ministry of Energy's bureaucratic obstacles where obviously the positions of the advocates of the zeolite catalyzers are strong. Somehow all of this is not joining the framework of normal intellectual competition.

Obviously this state task will not be resolved without the state. The program for the required small equipment should not be in a mold with the previous five-year plans and first of all in the sense of financing. Not a kopek from the state treasury! The optimal path to seek resources is to allocate quotas for oil to the pioneers, that oil which can be extracted from the bottom of unprofitable wells and quotas for the sale of petroleum products that they will be able to produce from it. Inventors are meticulous people: they will make rivers of gasoline, kerosene, diesel fuel, sulfur, and paraffin from streams of raw materials. All expenditures will pay for themselves many times over. A year will not pass after the mini-plants have been entered into operation when the volume of oil produced by them will be guaranteed returned to the state.

For its part, the Ministry of Energy or the appropriate commission should not drop from its hands the responsibility for the criteria of the discovered developments whose efficiency is higher than the others. The strategic importance of the task obliges them to make more precise the scale of the introductory work and the readiness of a number of structures of the former military-industrial complex to restructure their production to the output of a new generation of civilian products. There is reason to provide the representatives of an innovative business with unprofitable oil fields for operation of their mini-plants but under lease terms or on a licensed basis. As a result, we will obtain a real chance to once again become convinced: private initiative based on a state program is an impressive force in a market economy.

Decree on Economic Aid to Conversion in Udmurtia

935D0429B Moscow ROSSIYSKAYA GAZETA
in Russian 4 Jun 93 p 6

[Russian Federation Council of Ministers and Government Decree No. 469, issued 18 May 1993 in Moscow: "On Stabilization of the Udmurt Republic Economy During Conversion of Enterprises in the Defense Complex"]

[Text] Taking into consideration the definitive role of defense enterprises in the economic potential of the Udmurt Republic and in order to preserve its personnel

and scientific-technical potential, the Russian Federation Council of Ministers and Government hereby decrees that:

1. the Russian Federation Ministry of Economics and the Russian Federation Ministry of Finance shall make provision in 1993 for the allocation to enterprises in the Udmurt Republic undergoing military-to-civilian conversion of \$250 million of the total amount of foreign loans extended to Russia, with an advance payment to be made out of the Russian Federation's republic budget.
2. in order to develop priority sectors of the economy the Russian Federation Ministry of Finance and the Russian Federation Ministry of Economics shall ensure the extension of a favorable state loan to augment the operating capital of enterprises located in the Udmurt Republic according to a procedure and in amounts stipulated by the Government Commission on Lending Policy.
3. the Russian Federation Ministry of Finance in conjunction with the Udmurt Republic Council of Ministers shall when setting the indices of the 1993 budget system make provision for an additional subsidy in the amount of R15 billion [rubles] to be used to develop the Udmurt Republic's social realm and agro-industrial complex.
4. the Russian Federation Committee for Defense Industry, the Russian Federation Ministry of Defense, the Russian Federation State Committee for State Property Management, the Russian Federation Ministry of Economics, the Russian Federation Ministry of Finance and the Russian Federation State Committee for Precious Metals and Gemstones shall in conjunction with the Udmurt Republic Council of Ministers within one month's time draw up a program for the utilization of military equipment and transfer to the Udmurt Republic of revenues received from the sale according to established procedure of precious metals extracted from parts and components of military, specialized and civilian products at enterprises located within the territory of the Udmurt Republic. These funds are to be used to finance a program to improve defense production, conversion of enterprises and construction of facilities for the Udmurt Republic's social realm and agro-industrial complex.
5. the Russian Federation Ministry of Economics, the Russian Federation Ministry of Foreign Economic Relations, the Russian Federation State Customs Committee, the Russian Federation Committee for Defense Industry, the Russian Federation Ministry of Finance and the Russian Federation Ministry of Defense in conjunction with the Udmurt Republic Council of Ministers shall prepare and submit to the Russian Federation Council of Ministers and Government according to established procedure by 1 June 1993 proposals regarding the granting to defense enterprises located within the territory of the Russian Federation exemptions in regard to the payment of export and import customs duties on shipments of weapons and military equipment that are exchanged for purchases of equipment to carry out military-to-civilian conversion at those enterprises, with a view toward repayment of extended payments in varying shares in 1996-98.
6. the Russian Federation Ministry of Foreign Economic Relations in conjunction with the Udmurt Republic Council of Ministers and interested Russian Federation ministries and agencies shall within two months' time draw up a series of measures to provide support to developers and manufacturers of military products and services in their efforts to enter the foreign market.
7. the Russian Federation State Committee for State Property Management in conjunction with the Russian Federal Property Fund, the Russian Federation State Committee for Industrial Policy and the Russian Federation Committee for Defense Industry shall within one month's time prepare a draft accord concerning the Udmurt Republic's participation in the administration of blocks of stock in enterprises undergoing conversion which are federal property and are located within the territory of the Udmurt Republic.
8. the Russian Federation Ministry of Fuel and Energy shall in conjunction with the Udmurt Republic Council of Ministers ensure full realization of the oil export quotas granted to the Republic.
9. it is recommended that the Central Bank of the Russian Federation extend until 1 October 1994 the term for repayment of the money received by defense enterprises located within the territory of the Udmurt Republic to augment circulating capital in 1992, and for repayment of other loans which come due in 1993.
10. the Russian Federation Ministry of Economics and the Russian Federation Committee for Defense Industry shall prepare proposals regarding inclusion of the cities of Izhevsk, Votkinsk, Glazov and Sarapul in the list of cities to receive development priority in consideration of their specific characteristics and the need to accelerate implementation of conversion programs.
11. the Russian Federation Ministry of Finance and the Russian Federal Forestry Service shall in conjunction with the Udmurt Republic Council of Ministers resolve the issue of partial financing with funds from the Russian Federation's republic budget to cover expenditures incurred in connection with reforestation and forest protection efforts.
12. the Russian Federation Ministry of Economics shall reconsider the extension of a favorable investment credit to the Izhevsk Airline Enterprise in 1993-94 for the purpose of acquiring two Yak-42 aircraft.

[Signed] V. Chernomyrdin, Chairman of the Russian Federation Council of Ministers and Government

Military Metrological Laboratories to be Used in Civilian Economy

93UM0625D Moscow KRASNAYA ZVEZDA
in Russian 5 Jun 93 p 4

[Article by Lt-Col Aleksandr Dolgikh: "To Each His Own Arshin?": Military Specialists Will Assist in Organizing a System of Metrological Support in the Country"]

[Text] A three decibel error in measuring the output of a radar transmitter at the tactical level carries with it an error of several kilometers in determining range. A 0.1 percent error in setting the frequency of radio stations disrupts letter-printing communication, and a one-hundredth of a microsecond error in "fixing" long-range missiles reduces target accuracy by several hundred meters. What this means is that metrology and the standards base are important.

With the disintegration of the Union, a number of state standards remained outside Russia. Today, only military metrologists still have experience and general scientific knowledge in relation to a number of directions of the development of instrument making. There was good reason why a decision was recently made to draft proposals as soon as possible on procedures for using military standards as state standards, and to determine the policy of using metrological laboratories of the Russian Ministry of Defense, including mobile laboratories, for metrological services to national economic facilities.

It will not be easy to carry out these instructions: The number of instruments the Ministry possesses today is far from enough to satisfy its own needs. And most of the scientific and industrial base of the subsector remained in other former Union republics. Of 12 of the corresponding scientific research institutes and design offices in the former Union, seven were Russian. They were responsible for a little more than 45 percent of the total volume of scientific research and experimental design work. Ukraine's share was 9.3 percent, Belorussia's was 15.2 percent, Estonia's was 4.5 percent and Lithuania's was 26.4 percent. In this case mobile measuring laboratories were developed chiefly by enterprises in Minsk, Kalibr and the Belvar Production Association. The mobile laboratories significantly raised the fighting capability of the forces. But now most such laboratories are behind the cordon, and no one in Russia is able to develop or produce them in sufficient quantities as yet.

And even in quality, some types of instruments are inferior to Baltic, Belorussian and Ukrainian ones. And when it comes to certain types of articles such as oscillographs, Russia lacks the production base altogether.

How do we escape this predicament? Without metrological support, after all, it is impossible to dream about new, high-precision armament systems, competitive products and entry into foreign markets. The best thing

of course would be to restore broken ties and establish cooperation. The ice is beginning to break in this aspect, by the way. The need for preserving the unity of measurements was recently raised at the intergovernment level.

Russia's problems are even more typical of the near frontier, where local standards are frequently unavailable. The second path is to organize mutually advantageous exchange of series-manufactured instruments and scientific and technical developments.

But in the meantime associates of the metrological service of the Russian Armed Forces studied the material-technical base of Russian design offices, scientific research institutes and plants capable of series production, and determined the ways to produce articles that had been developed "abroad." Thus in their opinion the Krasnodar Ritm NIIRIA was capable of taking over production of alternating-voltage precision calibrators and general-purpose high-precision voltmeters previously manufactured by the Belvar Production Association and Tallinn's RET Punane; the Nizhegorod NIPI was able to adopt development of frequency measuring apparatus (the product assortment of the Production Association imeni S. P. Korolev, Kiev); the Mytishchi NIIRIP of the Kontakt Production Association can hypothetically take over the work of the Kaunas NIIRIT in the area of measuring the parameters of vacuum and semiconductor instruments and integrated circuits, and so on, for all of the different forms and types of instruments.

Things that military metrologists have developed might also be interesting to other enterprises which have found themselves with extra production capacities as a result of conversion and which have the possibilities for retooling them for production of metrological equipment. Users of these products can always be found, by the way. This is as a rule dual-purpose equipment, after all. The ideas of military metrologists have already been summarized in a document that will very soon be submitted to the government.

In general, despite the economy's instability, the scientific-technical foundation that has been built up by Russian defense enterprises and by scientific research organizations of the Russian Ministry of Defense is still sufficient to permit creation of modern models of equipment. However, in the opinion of Major-General Vladimir Ivanovich Popov, the chief of the Metrological Service of the Russian Federation Armed Forces, and his subordinates, the decrease in allocations to military science, the crumbling intellectual potential of defense scientific research institutes and design offices, and the drain of qualified specialists that has started from them could cause Russia to fall behind developed countries in science-intensive fields such as microelectronics, computer technology and instrument making.

I would like to believe that implementation of the state conversion program will help us avoid this.

Russian Exhibit at Birmingham UK Conversion Expo

93UM0608A Moscow KRASNAYA ZVEZDA in Russian
8 Jun 93 p 3

[Interview of Chief of the Main Scientific-Technical Directorate of Roskomoboronprom Vitaliy Vezirov: "'Conversion-93' in Birmingham: Russian Defense Enterprises 'Cut' a Window to Europe, With Good Results"]

[Text] Considering the great interest of western industrialists and businessmen in the process of reshaping of our defense enterprises to produce civilian goods, from 24 to 27 May a special exhibition "Conversion-93" was held in Birmingham (Great Britain). We asked the Chief of the Main Scientific-Technical Directorate of Roskomoboronprom, Vitaliy Vezirov, to talk about it.

"First of all, I would like to say that it was a purely Russian exhibition," said Vitaliy Niyazovich. "Around 200 enterprises, design bureaus, and scientific research institutes of different branches of the Russian defense industry demonstrated their conversion products at it. The Birmingham exhibition was the logical continuation of two preceding ones, the first in Munich in 1990 and the second in Bologna in 1991.

[Question] But now we are more oriented toward markets in Southeast Asia and the Near East. What are our chances of "cutting" a window into Europe for our conversion wares? As you know, you won't surprise the West with teapots of stainless steel, or even yachts.

[Vezirov] But it is not a question of surprising anyone with teapots or yachts. That is a completely hopeless exercise. I think the time has passed when conversion was understood as production of saucepans and other broad-consumption items at the defense enterprises. Today it is a matter of using, for civilian purposes, those unique technologies of the defense complex in which, to put it in the old terminology, we are still "ahead of the whole planet." That is precisely where the accent was put at the exhibition.

But then, the wares produced in accordance with conversion did not go unnoticed. Much of what we brought to Birmingham, including a yacht, did not return to Russia. They were bought right at the exhibition.

[Question] What exhibits do you think were a sensation for western firms?

[Vezirov] I think there were many such. Each branch of the defense industry had its own stars at this exhibition. Take the laser surgery apparatus developed at the design bureau of instrument building directed by Academician Shipunov. This apparatus is intended for bloodless dissection and biological welding of tissues, and also for coagulation of hemorrhages in traditional surgical operations. There is no doubt that it will find a buyer. After all, there is nothing else like it in the world yet.

A number of western firms showed great interest, up to the point of signing contracts, in the products of the Tula Gun Plant. For many it was a revelation that the Tula gun-smiths are now producing not the renowned Kalashnikov assault rifle, but unique hunting and sporting weapons.

On the basis of technologies utilized in antenna arrays, scientists and designers of the radio-electronics industry have developed a whole family of apparatus for the treatment of various traumas. Thanks to these apparatus, just three days after breaking an arm, for example, you can take the wheel of a motor vehicle.

Or take the super-hard materials produced in accordance with special technologies, from the same components as conventional munitions. Even diamonds may be worked with their help.

Nor should I joke about the telescoping fishing rods and tennis rackets, and other consumer wares shown at the exhibition. Any fisherman would like to have a rod like one of these. It is extremely light and strong, when folded is no larger than a lady's parasol, but in operation has a length of 6 meters. But we brought it to England not so much for the enjoyment of angling enthusiasts, but to demonstrate to the experts the capabilities of materials used earlier in combat equipment.

[Question] You are describing some interesting things. Nonetheless, the reaction of the western press to the "Conversion-93" exhibition was mixed. The British papers DAILY TELEGRAPH and THE GUARDIAN for example, pronounced it unique. They noted that the exhibition provoked great interest not only within business circles of Great Britain, but also in many other countries of the West. But then the INTERNATIONAL HERALD TRIBUNE of 25 May wrote: "There were few visitors on the first day of this four-day exhibition, the purpose of which is to attract western companies to participate in joint projects with their Russian colleagues. Reaction to technologies, which the exhibition brochure advertised as having been developed at 'incredible cost,' was quite cold." How objective are these critiques?

[Vezirov] Each saw what he wanted to see at the exhibition. That is why the critiques were so polarized. Don't forget that no one is welcoming us with open arms into the world market. A hard competitive struggle is under way, in which the role of the press is of some importance. They understand over there that the high level of Russian conversion technologies and wares plus the lower prices due to very cheap labor will give us some chance of penetrating the world market. Naturally they are seeking to counter this process by every available means.

As for the first day of the exhibition, it was indeed a peculiar one. There were a lot of journalists and not many industrialists and businessmen. Perhaps this is the result of the insufficiently well-organized advertising campaign. It should not have been launched three weeks before, as was the case at the last exhibition, but much earlier.

But overall the "Conversion-93" exhibition was marked by a dry but businesslike atmosphere. In my view, the international symposium on the problems of conversion investment, conducted within the framework of the exhibition, was interesting and informative.

[Question] We know that the government had decided that the Birmingham exhibition would take place in March. Why was it postponed until May?

[Vezirov] As you might guess, the reason was quite prosaic—a lack of the necessary hard-currency resources. Incidentally, we had intended to hold it not in March, but in November-December of last year. But we were only able to find the money in April. All the financing for the exhibition came from a government line of credit on the condition that the funds be returned in the future.

[Question] And when will this occur? Or will it occur at all?

[Vezirov] Today no one can answer this question. Contracts are not signed at exhibitions unless special preparations have been made. So it is not possible to calculate the results of an exhibition in rubles or dollars right after it is over. But it is very promising that representatives of around 280 foreign firms, not only of Great Britain, but of a whole group of other countries, visited the exhibition. First steps were agreed with many firms right at the exhibition, and protocols of intentions were signed.

The conduct of exhibitions abroad is an overhead expense. But I am convinced that in any situation, it is one that must be undertaken. After all, there is simply no better opportunity for our defense enterprises to make themselves heard, and to get their goods into the world market. Thank God, today it seems that everyone has recognized this.

[Question] So more international exhibitions are ahead for the defense complex?

[Vezirov] I hope so. And not only in Europe.

INDIVIDUAL PLANT CONVERSION

Volsk-17 Scientist Discusses New Chemical for Binary Weapon

93WC0038A Moscow *NOVOYE VREMYA* in Russian
No 6, Feb 93 pp 40-41

[Interview with Russian scientist Vladimir Uglev by Oleg Vishnyakov: "Interview with a Noose Around the Neck"; first paragraph is *NOVOYE VREMYA* introduction]

[Text] One of the creators of the domestic binary bomb asserts that this weapon is kept at a secret base in Bryansk Oblast.

He came a half hour before the stipulated time. He admitted that he was very nervous and did not sleep the entire night, preparing for the very interview of his life. Vladimir Uglev, until recently one of the leading Soviet

scientists in the area of chemical weapons, who worked for 15 of his 46 years under particular secrecy in the closed city of Volsk-17 (about 100 km from Saratov), nevertheless agreed to the conversation. In his words, he does not see any other way of publicly supporting his colleague Vil Mirzayanov, who has been subjected to criminal prosecution for supposedly divulging a state secret.

The "Mirzayanov case" has received extensive publicity in the Russian and world press. *NOVOYE VREMYA* was the first publication that was able to interview the scientist—the day before his arrest. In that issue, Mirzayanov told of a new class of toxic chemical agents obtained in the USSR, whose toxicity exceeds the heretofore known kinds of such compounds, and about a binary weapon created on its basis that violates if not the letter then the spirit of international agreements.

NOVOYE VREMYA then carried out its own investigation of the "case of the binary bomb." We were able to interview Andrey Zheleznyakov, the engineer from the State Union Scientific Research Institute for Organic Chemistry and Technology (GSNIOKhT) who participated in the laboratory experiments with the binary weapon on the basis of a substance under the code name of "Novichok" [Novice]. As the result of an accident, Zheleznyakov was subjected to the effects of "Novichok" and became an invalid for life.

The creator of this deadly weapon himself now sat in my editor's office.

[Vishnyakov] Vladimir Ivanovich, to begin, how did you come to military chemistry?

[Uglev] I finished the Moscow Chemical-Technological Institute in 1975 and was allocated to the Volsk branch of GSNIOKhT. I immediately found myself in the group of a renowned scientist who dealt with the development of new kinds of toxic agents. I will not give the family name of this person, for he continues to work at the institute. It was precisely he who in 1973 for the first time was able to obtain a fundamentally new phosphoric toxic agent with a paralytic action on the nerves that subsequently received the name "Novichok."

When I came to the laboratory, the work on the synthesis of the new compound was in full swing. They had carried out the initial investigations and obtained the first results. During the entire 15 years of my work in the laboratory, more than a hundred substances of this class were synthesized. Only five of them representing a significant "war interest" went through the full investigation. The dubious honor of discovering three of them belongs to me.

[Vishnyakov] What does "full investigation" mean?

[Uglev] The substance went through all three stages of the check: measurement of basic parameters, development of a technology of use, and, finally, field tests.

[Vishnyakov] Accordingly, the new substance was tested at the proving grounds at Shikhany?

[Uglev] I myself took part in the tests more than once. Several kilograms of the substance were produced for

each test on the experimental equipment. In principle, 1 kg would be enough to kill thousands of people.

[Vishnyakov] In the interview with our journal and in other publications, Vil Mirzayanov declared that the combat possibilities of the new compound exceed by a factor of five to eight the most powerful of the toxic agents now in existence—VX gas. The American press then gave the opinion of a specialist who said that this is impossible....

[Uglev] It is possible. Laboratory investigations have indeed proven that the combat characteristics of the new substance and VX must be approximately the same. But it became clear after tests on the range that our "product" is significantly more effective. The military people who handled these tests were long reluctant to report their conclusions to higher levels—they seemed so improbable.

[Vishnyakov] Still, how many times more powerful than VX is your "creation."

[Uglev] Naturally I do not have precise data with me. The military people have whispered to me that it is a minimum of 5-10 times.

[Vishnyakov] Do you think that your discovery is comparable with that of the Swedish chemist Tammlin, who first synthesized VX in 1956?

[Uglev] It is not up to me to judge that. I will note only that our scientists were close to the discovery of the new substance as early as the mid-1950's. It was only later that I discovered their calculations when I was working in the secret archives. But all their cards got shuffled by the reconnaissance report on the success of the Swedish scientist—the work was stopped and all of the efforts went into the creation of their own VX.

[Vishnyakov] Your discovery must have created a furor in scientific circles....

[Uglev] So it was, although initially we made every effort to keep the results of our work secret from our colleagues. This would have made it possible for us calmly to continue the research. But Viktor Petrunin, then deputy director of the Volsk branch, hurriedly reported on the success to Moscow. And then GSNIIOKhT Director Ivan Martynov immediately came to Volsk-17.

They provided us with first-class equipment. "You just work," they were saying. We continued the experiments but we no longer felt free. All of the experiments in our laboratory had the status of "especially important work," which in those years was considered the highest form of secrecy. All reports—written by hand, as required—went directly to Moscow, to the GSNIIOKhT.

Then, in 1976, we submitted an official claim for an inventor's certificate. Years passed and there was no answer from Moscow. Only after eight years did I find out quite accidentally that totally different people wrote their candidate's and doctoral dissertations using the

materials of the reports that we had been sending to Moscow. One of them was Bors Martynov, son of the then director of the GSNIIOKhT.

It then became clear that they had very simply stolen our invention and I wrote a letter to the director. They summoned me and my chief to Moscow and showed us the documents. The applications from 1976 had been replaced and our signatures forged. They offered us a deal—a substantial promotion in exchange for silence—but we refused. After much discussion we were able to exclude "extra" people from the application but no one thought about taking away their university degrees. Boris Martynov, a doctor of chemical sciences, continues to head a laboratory in the GSNIIOKhT.

I am convinced that this theft could not have occurred without the active assistance of Viktor Petrunin, a person without any moral principles whatsoever, in my view. He soon had a giddy career and now occupies the director's chair of the GSNIIOKhT.

[Vishnyakov] Is it true that neither the substance that you synthesized nor its components (precursors) was included in any one of the three lists of chemical substances or intermediate products whose stocks are subject under the Geneva Convention to mandatory declaration and inspection?

[Uglev] This is indeed so. In addition, even after having destroyed or "mothballed" all production capacities for the production of toxic substances in accordance with the convention, it will be quite easy in the event that something happens for us to organize the production of a new compound using the products of domestic peaceable chemistry. It is merely necessary to know the technology. This is still another "advantage" of the compound over other phosphoric toxic substances: sarin, soman, and VX.

[Vishnyakov] The managers of our military-chemical complex assert that Russia has never had and does not have a binary chemical weapon. Is this so?

[Uglev] This is not true. Of the three new toxic substances that I synthesized, one is a basic component of a binary that, according to my information, has gone through successful testing on the range.

I have information on the existence in Russia of a minimum of one kind of binary weapon made on the basis of the so-called "Novocheboksarskiy product," a substance that we declared as VX in all international agreements. I assume that the work on both binaries was performed simultaneously.

[Vishnyakov] In the case at hand, however, you speak of studies and tests but not of production. In the opinion of military people, a study does not count.

[Uglev] I know about production as well: a certain quantity of components of a binary weapon is now being

kept at a secret storage depot somewhere in Bryansk Oblast. If, of course, they have not yet destroyed it, "covering their tracks."

There is, after all, indirect evidence of the existence of a binary weapon—the Lenin Prize received by A. Kuntsevich, V. Petrunin, and other "strategists" in the spring of 1991. This could happen only after the issue of an experimental-industrial batch of the product.

[Vishnyakov] Can the components of the Russian binary be used individually in the domestic economy?

[Uglev] Such a weapon, if it existed, would be ideal for the military in every way. Any country, even after obligating itself not to produce chemical weapons, could nevertheless calmly produce components of the binary at civilian plants and utilize them as pesticides or dyes and if necessary always be ready for a chemical war. As far as I know, however, such a consummate weapon does not yet exist. At the same time, the substance that I synthesized can relatively easily be "masked" as a product of peaceable chemistry in the event of a sudden inspection.

As for the other nonbasic component of the binary on the basis of the new substance, it has a rather respectable application in the national economy.

[Vishnyakov] In what area?

[Uglev] I would not want to answer this question.

[Vishnyakov] In September of last year, the press published a list of chemicals and technologies with dual applications. Their export now requires special licenses. The directive was signed by B.N. Yeltsin personally. Mirzayanov asserts that this list does not include either the component of the new substance nor the "Novocheboksarskiy VX." Accordingly, they may calmly be exported from the country.

[Uglev] It is true that neither the one nor the other is found there. The list indicates the components of a binary on the basis of VX but the "classic" VX rather than the one that was produced in Novocheboksary over the course of 15 years. Although the "Novocheboksarskiy product" has the same empirical formula as VX— $C_{11}H_{26}O_2PSN$ —it differs substantially on the level of the radicals. Essentially this substance is only a related V-gas, which, however, does not lessen its military possibilities.

[Vishnyakov] But the president's advisers (apparently we are again talking about A. Kuntsevich) who prepared this list could not fail to know that it is incomplete. Did they really consciously deceive people?

[Uglev] I have no other answer to this question. In my opinion, these people could be guided by two motives: the possibility of the unhindered sale of strategic chemicals and technologies to countries like Iraq, Libya, or North Korea (I remind you that none of these countries has joined the Geneva Convention) and enrich themselves or, what is more probable, simply to "set up" the

president just before the signing of the convention, thus curbing the process of chemical disarmament. Nor do I rule out the possibility of a deal between Russian and American military chemists for the purpose of hindering detente.

[Vishnyakov] Are you serious?

[Uglev] You will understand that neither Kuntsevich nor Petrunin nor their American "colleagues" need chemical disarmament. When I came to Volsk-17 as a young man, I supposed that the country needs chemical weapons, for otherwise the Americans would long ago have unleashed a chemical war against us. But I could not get an answer from our military people to the simple question: Do we have any sort of a concept for the use of this kind of weapon? Even today I am convinced that we never had such a concept—chemical weapons were just a good means of existence for our generals, a "feed trough" in the form of state prizes, awards, and appropriations for studies.

They are now trying to forget about this but in the days of the coup in August 1991 the generals of the chemical forces were among the first to welcome the "restoration of order" and declared their support for the participants in the putsch.

[Vishnyakov] You understand that after the publication of this interview you may share the fate of Vil Mirzayanov?

[Uglev] I made this decision quite consciously and internally I am prepared for the possible consequences.

Reform Path of Instrument Building Institute

93UM0568A Moscow VOZDUSHNYY TRANSPORT
in Russian No 11 (2143), Mar 93 p 13

[Interview with Valentin Vasilyevich Matyashev, manager of the Scientific Research Institute of Instrument Building and winner of the Lenin Prize and State Prize, by Igor Polyakov; place and date not given: "The Instrument Building Institute: The Difficult Path of Reforms"]

[Text] Many enterprises of the military-industrial complex (including aerospace), striving to counter the decline in production, are making efforts basically in two directions: launching conversion programs and searching for "strategic" partnership with foreign companies, organizations, and state structures, including the arms business. One can request credits from the government and thus try to solve one's problems. But the experience of recent years indicates otherwise.

It is far more effective to look at matters differently and to think about the interests of a wide range of consumers, be they civilian or military, ours or foreign. The experience of the Scientific Research Institute of Instrument Building at Zhukovskiy near Moscow is interesting in this respect. Until recently, no one knew much about the highly classified "box" where missile systems and other unique

military systems are created. Only in the summer of last year did the institute take a step that was perhaps unprecedented in history, exhibiting models of its equipment, weapons, and ammunition on an open area at the Moscow Air Show. Western photo correspondents, aiming their lenses at the military products—since the days were sunny—just had time to click the shutters of their cameras...

We met with the manager of the scientific research institute and winner of the Lenin and State prizes, Valentin Matyashev. For many years he was a chief designer. He managed to bring together talented, creative, enthusiastic people who work as much as necessary, without regard for time, to fulfill this or that government assignment. This is the nucleus of the institute, and it determines its success. It was in the past decades that the equipment created by the institute proved itself in combat operations and staff exercises "Oborona-92" [Defense-92] and now demonstrates its brilliant capabilities.

However, we will talk about everything in order.

New Equipment, Conversion, and the Market

[Polyakov] Valentin Vasilyevich, in your view, what are the most interesting conversion programs being developed by the institute's collective?

[Matyashev] There are more than 20 of them. I will name a few of the most significant ones.

Project Vityaz. It is a electronic control system for a new-generation subway train, the development of which used much of our know-how and secret military high technology. It has been tested. Attending one of the start-ups, Russian President Yeltsin approved of the cooperation between the institute and the Mytishchi Railcar Plant: "This is a good example of cooperation between the military-industrial complex and a civilian enterprise."

[Polyakov] What is special about the development?

[Matyashev] I would note two among many. The train is controlled by an automatic device...

[Polyakov] ...Like an autopilot controls an airliner. You could say that you projected avionics to the ground.

[Matyashev] Precisely... Another thing is that the diagnostics information (and it is quite extensive: condition of junctions, equipment, structures, and their parameters—mechanical, temperature...) is fed to a display, as are the necessary recommendations for making specific decisions in the event a situation arises that is not regular. For example, the command may follow: such-and-such door is not closed, press such-and-such key. The entire program costs approximately 1.5 billion rubles [R] and is partially financed by the Moscow Subway. Three years will be spent on its development. I am confident that "Vityaz" will also interest railway workers. In such a case, the possibilities of the domestic market for it will grow continuously.

The "Electronic Meter" Program is oriented on housing construction. It is a new-generation device which also uses our technical know-how. Its brief characteristics are: a high degree of accuracy with a minimal internal energy consumption; also, which is most important, a telemetry output to automated regional systems. This opens up the possibility of constant monitoring of the supply of electricity to apartments and significantly simplifies the procedure for its payment. We have transferred the documentation to assembly-line plants, which under the terms of the contract will pay a percentage of the sale value (R2,800 for one unit at 1992 prices). But we also will produce them in small batches. At one time, a 10,000 square meter production building on the territory of the institute was planned. Construction began. Then financing was cut sharply. A dilemma arose: auction it off or finish building. A joint stock company was organized with the involvement of investors, and production was restructured to civilian products. This year we will begin production of consumer goods, including electronic meters.

"Relax" is another "medical" direction of the institute's commercial activities. A physiotherapeutic device massages the backbone and the muscle tissues around it. It has been approved by the Ministry of Health and recommended for use. There is a similar device in Japan that costs as much as \$50,000. Ours costs R300,000, but is not inferior in quality and is even superior, since it is made with heating. Other things being equal, this intensifies the physiotherapeutic effect. We transferred the documentation to two plants. Under terms of the contract, we will receive a percentage of the value. At our own experimental production facility we have already manufactured 20 units and have sold some of them at R130,000 each (we sold them cheaper to related enterprises). Those of our associates who have had a massage with the "Relax" have felt 10 years younger. I know for myself. It is an excellent thing!

There are several more new ideas, but it is not easy in our still bureaucratic system to push them through—I would not put it any other way. Those party bureaucrats of yesterday, who have "turned into" democrats, look at these things quite scornfully. For example, we could have designed and manufactured—very quickly!—a grain dryer. No problem! We know the subject matter down to the most minute details. This would have enabled us to save a considerable portion of our crop and, as a result, stop the drain of gold abroad. We tried to hint about investments for launching the work. Not likely! They did not want to listen.

Sell Weapons

[Matyashev] We say to foreigners: come and look at our military equipment. We have absolutely unique, new-generation systems, and they are less expensive than on the international market.

[Polyakov] Arms trading is perceived differently by many...

[Matyashev] All civilized countries engage in military business: the United States, England, Germany... If, for example, we turn down a potential buyer, he will get it from our competitor. Meanwhile, the armament being developed by the institute's collective has a particularly, I emphasize, **defensive nature** and enjoy good demand on the world arms market. However, there is one "but." The embargo placed by the Americans on the purchase of new types of arms by certain countries of the Middle East does not give us the opportunity to sell our products. A way out was found, so to speak, from an unexpected side. I will note that the equipment acquired earlier by our foreign partners up to now has been on alert duty. An example is the surface-to-air missile system called the "SA-6" in the West. In 1973, during the combat operations in the Middle East, it "cracked Phantoms" like nuts. Incidentally, it was for its development that a group of specialists at our institute was awarded the Lenin Prize. So, after preliminary coordination, we prepared a contract (the amount is a commercial secret) with the Egyptian side for...conducting major repairs and modernization.

We are also close to concluding a contract with the Chinese military department. We will deliver a fire control system equipped with a phased-array antenna. The device, created on the basis of the latest achievements in technology, is installed on the MiG-31 and makes it possible to retarget the guidance system instantaneously from one object to another or to attack several targets simultaneously.

Thus, we are not giving up our positions to our competitors. Nevertheless, a peculiar situation has remained until recently.

[Polyakov] *What do you have in mind?*

[Matyashev] The point is that it made no difference to the manufacturer, that is, our institute (like other enterprises of the military-industrial complex, too), whether we sold arms abroad or not. This would not have any effect at all on our incomes, since the earnings remained somewhere and never reached us. Today, it seems, the situation is changing for the better. Trade in these goods (for which we have been given a license) will make it possible to direct a large part of the foreign currency earnings directly to the performers and provide an incentive to those who, creating first-class military equipment, for many years received next to nothing and could barely make ends meet. This is especially necessary when the state order has been reduced several-fold.

In addition, selling on the arms market will also make it possible to invest in scientific and technical research and development of new-generation military equipment. I would add to this that it is the enterprises of the military-industrial complex, as a rule, powerful scientific and technical structures, that stimulate the development of peacetime sectors of industry, and that is why we need

to give the military aerospace sector an opportunity to improve, including by using funds from the sale of military equipment.

[Polyakov] *Still, how is the labor of the associates of your institute recognized?*

[Matyashev] Several creative groups oriented on performing specific-purpose tasks have been created, which has made it possible to increase the wages for specialists by a factor of 1.5-2. The intellectual return has also increased. It is namely this circumstance that can explain the fact that many of our conversion and military developments achieve the level of world or European standards.

A few words in conclusion. An enormous market is opening up before us—foreign and domestic. In order to enter this market with sufficient confidence, we need not only the financial support of the state and private foreign and domestic investors, but also the harmonious and energetic work of the collective and its management team.

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Amurmash Begins Bus Production

93UM0564B Moscow MOSKOVSKIYE NOVOSTI
in Russian No 13, 28 Mar 93 p 8B

[Unattributed article: "Amurmash Is No Longer Interested in Submarines: The Largest Defense Enterprise in the Far East Will Begin Producing Buses"]

[Text] A government program has been approved for conversion of the Amurmash Production Association [PO] (city of Amursk, Khabarovskiy Kray). The main product of the plant, which specialized in electronic and precision equipment for submarines and other combat equipment, will now be passenger buses. As the plant's general director, Yuriy Barsukov, stated, the government plans to allocate from the federal budget 2.9 billion rubles [R] for conversion of the enterprise (R650 million being state debt for military orders filled). It is planned to produce 50 buses in 1993, 300 in 1994, and 500 in 1995.

Karpaty Diversifies Away From Military Production

93UM0564C Moscow MOSKOVSKIYE NOVOSTI
in Russian No 13, 28 Mar 93 p 8B

[Article by Ilya Shkabara: "Karpaty Is Leaving the Military Industrial Complex: Ukraine's Largest Association of the Electronics Industry Is Forced To Abandon Military Orders"]

[Text] Beginning conversion in 1991, "Karpaty" planned to decrease production of military products only 30 percent in five years. However, the sharp decline in

the demand for them, the severance of economic ties, and the economic crisis forces the management of "Karpaty" to intensify to the maximum extent the process of changing its specialization. In 1992, the association managed to accomplish a large-scale conversion without a significant reduction in the volumes of production and number of employees. The percentage of military products decreased from 60 to 2 percent.

The conversion was conducted not by increasing the volumes of traditional civilian products (players and "Amfiton" sound systems), but by expanding their product mix. Diversification ensured stable production volumes in conditions of an unstable demand for individual types of products.

In 1992, "Karpaty" prepared and put into production 25 new products—8AS-01A and 10AS-03A motor vehicle sound systems, Lastochka-302 and Karpaty-02-Omega combination radio and tape players, Universal wood-working machines, VD-16 welder, and others. Virtually all the new developments have been through their own efforts—this not only provided employment but also reduced costs substantially. Thus, the design documentation for the Karpaty radio and tape player cost R177,000, and the cost for developing similar documentation at the Lvov PREA Scientific Research Institute exceeded R1 million. A total of about R50 million were spent on preparing production of the innovations.

"Karpaty's" participation in the national program for household appliances guarantees state support for the association—in 1992 it received R115 million in preferential (from 14 to 30 percent of the annual) credits and R5 million in direct subsidies to pay for certain developments.

In 1993, the association plans to abandon the miserly state order, which forces it to retain mobilization production capacities without yielding any income. "Karpaty" plans to complete the conversion having put into production high-quality and profitable equipment: top-rate sound systems, a double-cassette tape recorder, and remote controls for Elektron televisions. In addition, "Karpaty" plans to change its form of ownership. But for the time being, instead of authorizing transfer into a joint stock company, the association received an unofficial but unequivocal summary—"they do not sell milk cows."

Novosibirsk Plants to Convert to Civilian Products *934E0676A Novosibirsk DELOVAYA SIBIR in Russian No 13, Apr 93 p 1*

[Inf. "VS" report: "Conversion: Through the Tundra. And Not Only"]

[Text] Quite recently the designers of the Novosibirsk Plant for Low-Voltage Equipment, jointly with specialists of the Electrical Engineering University (the former Novosibirsk Electrical Engineering Institute) completed an original development of a gearless variant of a slow

drive. On its basis, the plant will turn out a multifunction kitchen machine, which can be used with the help of special extensions as a juicer, an oil-press, and a meat-grinder. It can also grind flour and stuff sausage.

Serial production of the kitchen machine, intended basically for farmers and rural inhabitants, is planned to be opened up during the current year.

And at another Novosibirsk defense enterprise—the Aviation Association imeni V. P. Chkalov—the model of a new roller and track-type cross-country vehicle has been developed. The vehicle is intended for the northern latitudes, where there are no good roads, but to make up for it there is no shortage of mud, swamps, and snow. It will be irreplaceable in the tundra for movement between derricks and inhabited settlements of oil and gas industry workers. The tests of experimental models, which were conducted in the north of Tyumen Oblast, were successful, and the Association imeni Chkalov has concluded a number of contracts with enterprises for the delivery of the cross-country vehicles, a distinctive feature of which is the comparatively light weight—a total of 2.5 metric tons. At the same time, still another new model has been developed in the association, on the basis of a boat hull. This is the gliding cross-country vehicle GSA-A. It will be used for unimpeded travel on water surface, water meadows, and shallow water. The workers of the enterprise have already proceeded with the manufacture of experimental models.

Dual Use of Uralsk OKB's Technology *934E0735A Yekaterinburg URALSK RABOCHII in Russian 14 Apr 93 p 1*

[Article by Ye. Vladyskin under "Conversion" rubric: "How Much Does a 'Smart' Missile Cost?: It Turns Out That the Russian Army Is Not Always Solvent"]

[Text] Yekaterinburg—It would not be easy at all for a spy who was miraculously able to penetrate the production premises of the "Innovator" Experimental Design Bureau [OKB] to determine the basic profile of the work of this defense enterprise. Indeed, in one section they are now manufacturing gas pistols, in another diamond-clad disks for cutting stone, and in yet another they are producing light plastic boats.

What is the reason for such glaring diversity? Are the defense workers reaping the fruits of thoughtless conversion and feverishly trying to load up capacities that are becoming available? By no means—the size of the state military order for the OKB in 1993 has not diminished but rather has tripled (a quite untypical case for the military-industrial complex). There is something else involved....

In the Heart of the Giant Plant

The complex of buildings of the "Innovator" OKB is located at the very center of the production site of the production association "Machine Building Plant imeni Kalinin." From the time of its establishment in 1947, the

OKB was the "heart" or more accurately the "brains" of the giant enterprise. Here they developed the most up-to-date and most secret kinds of military equipment and armament basically, as many now know, of an aviation and missile profile.

In 1991, the collective of the OKB decided to leave the plant structure. Despite the desperate opposition of Alexander Tizyakov (which was also understandable, for the plant was losing the main part of its research and experimental base with the latest equipment), the bureau did become independent. Prof. V. Smirnov, general designer of the "Innovator" KB, now thinks that the correct step was taken, at least the plant's problems are now worrying the designers less.

This cannot be said about their own problems—the OKB certainly has enough of its own. Yes, Russian military people decided to follow the example of the Americans and not to reduce the amount of research and experimental-design work, and the portfolio of orders is filled to the top, as they say. But the Defense Ministry, with very limited funding, pays very very little (for example, the wage included in the cost of developments originally amounted to 4,000 rubles [R] and now it is just R9,000. Meanwhile, the designers have been fully loaded with work and there is almost no time remaining for supplemental civilian orders.

It turned out, however, that you cannot get along without them. For the time being, the army is not even paying the money that was promised (the hard-working deputies from the Russian Armed Forces played a dirty trick and delayed the confirmation of the distributed budget). So the designers, foremen, and workers have been sitting for a month and a half or two months without wages. "Innovator" urgently had to assimilate civilian production to earn something and to be independent from the state budget.

But the OKB has no free capacities! You cannot throw out expensive vibration tables and laboratory equipment and put something in their place. How can you fulfill the state order that way? They chose another tactic. They studied the degree of job utilization and the possibilities for the double use of equipment. In the section for thermoprotective coverings, where they work with plastic, they began to build ship hulls (the next idea—large oceanic catamarans developed in cooperation with Holland). They use thermal ovens to produce diamond wheels.

Other conversion products include the gas pistols already mentioned (so far they have issued only an experimental batch), hand hydraulic hoists, compact jib cranes, machinery for the production of peat briquets, and—in the development stage—microwave ovens. Still another idea has arisen in the depths of the OKB, that of creating a so-called "citizen's pistol" with the help of which one can scare off a robber or put him into shock but not kill him (the designers are still not talking about the principle of its operation). The realization of this task

is certainly being held up by the lack of legislation permitting the use of such a weapon by upstanding citizens....

Target Destroyed!

Still, we are not going to forget that the OKB is also developing much more menacing "toys." For the first time in the entire history of its existence, it became possible to sell output abroad (previously it was intended exclusively for our own arsenals). The enterprise took part in a sensational international exhibition in Abu-Dhabi—to be sure, only with brochures and posters. Nevertheless, Uralsk technology evoked tremendous interest and in particular systems with "signs of artificial intellect" caused a stir.

A dilettante hearing about "artificial intellect" and especially involving the use of military hardware will immediately think of fantastic films about mutinous intelligent machines or about military robots that enslave the world. Actually it is all somewhat different: it is a matter of complex electronic equipment with maximum accessibility in management.

A reservist mobilized in the event of a military conflict will not immediately comprehend all of these on-board and ground computers, autopilots, guidance systems, and automatic detonators.... For this reason, the machine must do everything itself: for example, detect a target, determine the altitude and speed of its flight and degree of danger, make a decision, and, if necessary, destroy the enemy. And all of this becomes possible only because the intellect of tens, hundreds, or thousands of developers goes into its programs.

It is understandable that any country wants to have such weapons. But all applications will go through the strictest evaluation in the Ministry of Foreign Economic Relations and other competent organizations. And by no means will they always be carried out. Nevertheless, the first steps have already been taken to organize joint developments in cooperation with the United States, China, and United Arab Emirates.

Another direction of the work of the OKB is the salvaging of obsolete weapons of both domestic and foreign development. In so doing, tons of expensive metals can be returned to the economy, especially "winged" metals such as aluminum, titanium, and magnesium alloys.... And this means foreign exchange, goods, and housing for Russian officers.

We will not be excessively optimistic, however. As was already mentioned, the OKB has enough difficulties of its own. But the enterprise does not even have a kopeck of debt, still gets along without loans, does not know what it means to "sit on its files," and is not laying off specialists. There is something to be envious of here.

Privatization of Uralmash Heavy Machine-Building Plant

93UM0564D Moscow *EKONOMICHESKAYA GAZETA* in Russian No 16, Apr 93 p 14

[Article by Professor L. Filosofov, doctor of technical sciences: "Uralmash Is Being Privatized"]

[Text] Right after ZIL, another domestic giant has been put up for auction—the Ural Heavy Machine-Building Plant—Uralmash (city of Yekaterinburg).

The enterprise was built in 1928-1933, has been awarded many orders, and in 1971 was transformed into the production association of the same name.

Uralmash is well known. In the past one often heard about it and its products over radio and television: walking excavators, rolling mills, and drilling rigs. The association produces various equipment: metallurgical, for the mining industry, and also consumer goods.

In addition to producing press-forging equipment, Uralmash also sometimes forged top-rate economic managers of the USSR. N.I. Ryzhkov was once director here.

The association employs about 30,000 people, has a land area of 602.7 hectares, and assets of about 17 billion rubles [R] as of 1 January 1993.

The capital stock of the "Uralmashzavod" Joint Stock Company is R1,803,191,000 and is split up into 1,803,191 shares with a face value of R1000; 513,909 shares of stock have been put up for auction.

To those who have decided to become co-owners of the famous plant, we want to offer an analysis of its financial condition. We have tried to make it using the same format as the analysis of the financial condition that was published earlier for the "ZIL" AMO (*EKONOMIKA I ZHIZN*, No 13, 1993). This will make it easier for the reader to compare the indicators of both enterprises.

Unfortunately, information about Uralmash's financial indicators is quite sparse in the available materials. Something can be gleaned from the official notification about the start of subscription for shares of stock in the "Uralmashzavod" Joint Stock Company [AO]; these data have also been used as the basis of the analysis. The analysis was conducted basically by methods used for similar purposes by American and West European financial analysts. Some details in this connection can be found in the newspaper *REFORMA*, No 10, 1993.

The results of the calculations have been tabulated; the table gives the values of the analytical indicators for the financial condition of Uralmash in 1992 and the normative values of these indicators.

The first five indicators, according to American research, are the basic ones influencing the projection of the possible bankruptcy of joint stock companies.

Among them:

Indicator 1 characterizes the proportion of free liabilities of the joint stock company's assets that are in mobile form;

Indicator 2 characterizes the effectiveness of the joint stock company's work in the past; for all our joint stock companies we assume it to be equal to zero, since their activities as joint stock companies are just beginning;

Indicator 3 characterizes the profitability of the joint stock company;

Indicator 4 characterizes the quality of the joint stock company's assets (percentage of loan capital in them);

Indicator 5 characterizes the effectiveness of using assets to produce products that are in demand.

The table gives values for three more indicators characterizing individual aspects of the financial condition of Uralmash:

Indicator 6 characterizes the liquidity of the balance sheet (the ability of the joint stock company to pay current debts);

Indicator 7 is an additional characteristic of asset quality;

Indicator 8 is another characteristic of the profitability of the Uralmash association.

As can be seen from the table, in 1992 the "Uralmashzavod" AO had normative values of profitability (indicators 3 and 8) and asset quality (indicators 4 and 7). This characterizes from the good side the joint stock company's financial condition, since in 1992 the financial condition of most enterprises worsened markedly. At the same time, the liquidity indicator (6) and its associated mobility indicator (1) were below normative values, which indicates a possible shortage of available working capital at the joint stock company's disposal. The level of asset turnover (indicator 5) is noticeably lower than western standards, but this, it seems, is a general peculiarity of some of our enterprises, which have on their balance sheet many non-production facilities, and production facilities are not used efficiently enough.

Indicators	1992	Norm
1. Working capital/total assets	0.15	>0.26
2. Accumulated capital/total assets	0.00	>0.21
3. Profit/total assets	0.10	>0.10
4. Capital/total debt	1.91	>1.90
5. Sales volume/total assets	0.42	>1.60
6. Current assets/current liabilities	1.45	>2.00
7. Total debt/total assets	0.34	<0.40
8. Profit/capital	0.15	>0.15
Summary indicator	2.01	>2.40
Summary indicator Pnb	0.54	>0.70
Value of stock (rubles, in 1991 prices)	≈ 100	

On the whole, the summary indicators Z and Pnb for the financial stability of the "Uralsmashzavod" AO proved to be lower than the average values. The first of them is used in the United States to forecast possible bankruptcy of corporations; the second characterizes the probability that the AO will not go bankrupt within the next seven years following the reporting year. The value of the second indicator is arbitrary in the sense that it is calculated based on the assumption that approximately 5 percent of the joint stock companies in operation will go bankrupt each year (for the established market economy of the United States, such a figure is about 1 percent). With a different rate of bankruptcies, the absolute figures of the indicator and its normative value will change, but the correlation between them will stay the same. The low values of indicators 7 and Pnb are basically linked to the low values of asset turnover (indicator 5) and accumulated capital (indicator 2). It is noted in foreign literature that the low value of indicator 2 basically distinguishes young joint stock companies (corporations) that have not had time to accumulate capital; these corporations also go bankrupt more often. To a certain extent, this will also apply to joint stock companies being created, since becoming a joint stock company drastically changes the conditions in which former state enterprises will have to conduct economic activities.

The computer program used for calculating these data gave a surprisingly low value of the stock shares of the "Uralsmashzavod" AO—only about R100 (in 1991 prices). A more careful study showed that the value was determined correctly, and the reason for the low value was basically the low price per share of ownership in the joint stock company. Judge for yourselves. According to the plant's balance sheet, as of 1 January 1993 the value of its property was about R11 billion. This amounts to R6160 for each of the 1,803,191 shares of stock, which is very low, if you consider that these are 1992 prices. For comparison, during privatization of the Motor Vehicle Plant imeni Likhachev [ZIL], this indicator was R24,980.

Since the structure of utilization of the plant's profit so far has not provided for payment of dividends to stockholders of the "Uralsmashzavod" AO, we assumed, as before, that a third direction would be added to the existing two directions for utilization of net profit (development of production and the social sphere and worker incentives)—payment of preferred and common dividends, for which a third portion of the profit is used. Realistically, this portion will be determined by the future stockholders of the "Uralsmashzavod" AO.

The participants in the auction can make up for the above-noted shortcoming of the shares in the "Uralsmashzavod" AO if they receive a larger number of shares for a voucher. In order to orient oneself in this matter, it makes sense to compare the value of the share of stock with the value of the voucher in the same 1991 prices.

The value of the voucher and share of stock was calculated according to the same method based on updated

data on the overall value of federal and municipal property being privatized (R7500 for one voucher in 1991 prices, REFORMA, No 3, 1993), its yield (≈ 12 percent, "Narodnoye khozyaystvo Rossii" [Russia's National Economy] 1992), with the same portion of profits being allocated for paying dividends. It was about R2000 in 1991 prices.

Thus, 20 shares of stock in the "Uralsmashzavod" AO with a face value of R1000 could be considered a fair price for the voucher. However, there is doubt that it will be possible to receive such a price at a check auction: voucher-holders usually make them out for much less than they are worth.

Votkinsk Plant To Produce Washing Machines

93P50214 Moscow NEW TIMES INTERNATIONAL
in English No 22, May 93 p 21

[Unattributed item under the rubric "Outlook":
"Defence Plant To Produce Washing Machines"]

[Text] The Votkinsk plant in the Urals, a secret defence enterprise in the past, was visited by the presidents of GAM Industriale and Sital, Italian firms specializing in the manufacture of household washing machines. The talks with the Italian businessmen ended in the signing of a contract for cooperation. Italian specialists will train Russian personnel to use progressive technologies; the firms will also supply and install equipment. As a result of this cooperation, the Votkinsk plant will begin the mass production of automatic washing machines measuring up to world standards. In the opinion of experts, demand for these machines in Russia is practically unlimited.

Catch-22 Prevents Former Anti-CW Product Maker From Converting

93UM0553B Moscow KRASNAYA ZVEZDA
in Russian 4 May 93 p 3

[Article by KRASNAYA ZVEZDA correspondent Yuriy Shatalov under the rubric "Conversion": "Do Not Drink Without 'Sorbent' or You Will Turn Into a Little Goat"]

[Text] Perm—Having successfully protected our fighters against chemical weapons, Perm industrial workers are having a hard time getting through to the general consumer with their unique product.

Just recently the general public knew almost nothing about this enterprise, even though it was never one of the

"group of nine," that is, the military-industrial complex. It was not one of them, but 80 percent of the association's output went for defense needs. It consisted mainly of various means of protection against chemical weapons.

I speak of these expensive items in the past tense, because "Sorbent" has stopped producing them. In March of 1992 the Ministry of Defense suddenly stopped using the association's services and products.

"And so we found ourselves without military orders, with warehouses crammed with defense products and assembly parts, left alone with our woes," says Yevgeniy Galkin, the association's general director.

And there was cause for woe. While military plants directly related to the "nine" had access to preferential loans and nonreimbursable subsidies, which enabled them to collect themselves and remain afloat following the massive cut in military orders, "Sorbent," an enterprise in the chemical and petrochemical industry could not count on that kind of assistance. The association's administration was in essence faced with a dilemma. It could either shut down half of the plant or go into debt and begin producing consumer goods. The latter was chosen. A new technology for the production of cosmetics—shampoos, deodorants, lotions—totally new to them, was urgently worked out. They loaded to the maximum capacities for the production of Rodnichek and Superrodnichek home water purifiers and other civilian products. And they survived.

These were emergency measures, of course, which justified themselves brilliantly. For 1993 and the years following they worked out a program for total demilitarization of the enterprise: that is, the point of complete conversion to the production of consumer goods and items for the civilian economy. The program consists of seven main areas. It covers the production of 50 kinds of sorbents for the civilian economy, for example, and a broad range of water purifiers, filter fabrics and home water heaters.

The association signed a contract with the Perm Motory joint-stock company for the joint production of MB-200 engine blocks and has already turned out 32,000 sets of parts for it. It has produced test models of flour grinders and hullers for farms and peasant holdings, and has mastered the production of cosmetics. In addition, the association is in a position to set up production of bandages for burns, sorbents for internal use, hemosorbents for the purification of blood and a great deal more.

A minimum of 1 billion rubles is needed to implement the program for converting the enterprise totally to the production of consumer goods and products for the civilian economy. Unfortunately, however, preferential credit for the "Sorbent" production association is not a part of the plans of the Russian Federation's Ministry of the Economy. It is apparently felt that there are more important things. But what could be more important than medicines, as an example, which the association is ready to begin producing this very year? I recently went

to a pharmacy for some antacid tablets. The pharmacist looked at me in amazement, as though I had fallen from the sky, and said:

"We have already forgotten when we last received any of those."

To verify what she had said, I dropped into another pharmacy, and then a third. They were also out of the tablets. And they will be out as long as there is not a single plant producing the product in Russia. (Previously Ukrainian pharmaceutical chemists provided antacid tablets for almost the entire former Soviet Union). The Perm people could saturate the domestic market with enterosorbents within a year or two, if they could come up with the 350-400 million rubles needed to buy the Russian-made equipment.

The same is true of sorbents. The food and processing, medical, chemical and petrochemical branches of industry could not exist without them. Each year they spend tens of millions of dollars to buy sorbents abroad, while a plant stands idle in the homeland, which could very rapidly satisfy the needs of our industry for these chemical elements and sell them to the entire world for that same foreign currency. Is this really a statesmanly approach to the matter?

There are not many cities or settlements left in Russia where one can drink one's fill of tap water without detriment to one's health. Foreign delegations bring their own drinking water to Perm, for example. In view of this, the "Sorbent" specialists have developed an entire class of units for purifying water not just of chemical elements but of rare nuclides. What is more, the enterprise's capacities enable it to produce both mini-units for use in private apartments, offices and kindergartens, and modular units for large cities and workers' settlements.

I could cite other convincing examples of how the conversion program developed by the "Sorbent" people is of state importance. Unfortunately, however, it has not received adequate attention from the ministries and departments. And it is not just a matter of credit and subsidies. The Ministry of Defense and the Ministry of the Economy have still not been able to make a decision on the so-called mobilizational capacities. A paradox has therefore developed: There have been no military orders for a long time, but the association is strictly forbidden to convert the shops to civilian products. To make matters worse, the enterprise collective is forced to maintain these capacities at its own expense, even though the law on conversion clearly states that these costs are to be borne by the state. The expenses are considerable, by the way.

Can we count on getting things moving in the near future? Probably not. After all, we still have no military doctrine or laws on the status of defense enterprises and associations and their equivalents, on state secrets and military orders, and other legislative enactments without which the law on conversion is like a stillborn baby.

LAND ARMS

Spetsmash, T-80 Tank Designer on Arms Sales

93UM0568B St. Petersburg
SANKT-PETERBURGSKIYE VEDOMOSTI
in Russian No 73 (472), 1 Apr 93 p 2

[Interview with Nikolay Sergeyevich Popov, general designer of "Spetsmash" and Hero of Socialist Labor, by I. Lisochkin, special SANKT-PETERBURGSKIYE VEDOMOSTI correspondent; place and date not given: "Applause for the T-80"]

[Text] "Armor is strong, and our tanks are fast, and our people are full of courage..." (Do not be surprised, reader. This is an epigraph. You will exclaim: "But it does not fit the times!" How is one to know...)

Today on the pages of our newspaper we are giving Nikolay Sergeyevich Popov a chance to speak. We are convinced that our readers associate his name only with creation of the K-700 tractor. But that is by far not everything.

A few more words as an introduction. Over a period of many years, according to indirect and fragmentary information, we were able to guess that our city is one of the largest tank building centers. This indeed is the case. On the territory of the Kirovskiy Plant, a lengthy building of harsh contours stands next to the production buildings. In front of it is a monument to Zhozef Yakovlevich Kotin.

This is the famous OKBT [Special Design Bureau of Tank Building], now "Spetsmash." In this building were born the designs of combat vehicles which determined not only the might of the armed forces of the fatherland and were another step in development of equipment, but also influenced a number of aspects in politics and interstate relations, as we know based on the results of many diplomatic negotiations.

Nikolay Sergeyevich is a general designer at "Spetsmash," a Hero of Socialist Labor, and holder of a number of other awards and titles. He supervised the developers of many vehicles, but the T-80 tank occupies a special place among them and is rated extremely highly both in our country and in the world. A recent exhibit of military equipment in Abu Dhabi, United Arab Emirates [UAE], served as the direct reason for the interview with him by our special correspondent, I. Lisochkin.

[Lisochkin] An unusual trip!

[Popov] Yes. I have had the opportunity to visit abroad earlier. In the GDR and Poland, in Vietnam and Afghanistan, primarily at units of our Army. This time I saw a completely different world, another way of life. But perhaps it was even more interesting that I was able to see the most advanced military equipment of many

countries, not on the pages of journals and in descriptions, but in real life and to talk to and exchange opinions with foreign colleagues. It was great to talk with designers.

[Lisochkin] Russia has never before shown the most modern models and systems at international exhibitions, and in such numbers. As it became clear in Abu Dhabi, foreign experts earlier did not even suspect the existence of some of them. Instinctive concern crept into the reports which were broadcast from the exhibition: Are we "undressing ourselves" in front of other countries? Are we giving out our military secrets for free?

[Popov] A curious question, and a very old one. For decades the most modern models of armament were sent only to our Army. For example, the T-80 tanks were never supplied even to our former Warsaw Pact allies. It was the same in trade. We strove to sell that which was a little older and not quite as good. I have long considered such a policy to be erroneous. The world market demands modern types of arms of the highest quality.

Maybe this incorrect policy is not the primary reason that our country's share of the world arms market has dropped to 10-12 percent. But it certainly had something to do with it. If you consider foreign currency, we lost billions of dollars.

Yes, there was something to see in Abu Dhabi. The S-300, "Smerch," "Tochka-U", and "Msta-S" systems, and these are only a few... Their demonstration and demonstration firings left more than a disturbing impression on the representatives of dozens of countries. Russia demonstrated the overall level of its arms, and it turned out that its achievements are higher than anyone else for a whole series of directions.

Fears about "undressing ourselves" are highly exaggerated. When an "item" goes into series production and enters the troops, it is virtually impossible to conceal its basic specifications and performance characteristics and particular features from reconnaissance, including space reconnaissance. And the secret is not what is already in the Army, but what is still maturing in the laboratories and design bureaus. This is the latest and will be guarded night and day.

In the Emirates [UAE], models that are already in service in various countries of the world were shown. Of course, I was interested primarily in tanks...

[Lisochkin] You are called a "fanatical" tank builder. How does a person get into this profession? Please tell us a little about this. Even in preparing for the interview, I could not find out literally anything about your biography.

[Popov] Like many young boys, in my early youth I dreamed of becoming a pilot. I even completed a special school of the Air Force, but could not enter Mozhayka due to the extremely strict medical restrictions. I traveled throughout the country and visited Leningrad and

Ukraine. Then I chose the Kharkov Polytechnical Institute, motor vehicle building... This seemed close to me: interesting designs, speed. But in the third year I ended up in the tank group, and it turned out that this was fate.

Can you "fall in love" with a tank? Yes, you can. Due to our many years of secrecy, there are few who know how "smart" this vehicle is and what it "knows how to do." If you like, I can cite a fairly curious example. There is a remarkable, outstanding engine builder and turbine specialist, Sergey Petrovich Izotov. We worked a lot with him. And who, if not him, on whose motors helicopters fly, would know all the details of military equipment? But one day he was sitting in a tank at the training range and covered the gap. After that, he said to me: "I never before imagined that this was such a complex and interesting machine..." See how it happens.

I think that another circumstance influenced my choice of profession. As a boy, I lived through war, saw human grief, death, and destruction, and spend six months in occupation. Already after our liberation, I had a meeting with my father, who was returning to the front from a hospital in Baku. With bitterness he told about how difficult it was to fight when there were two rifles for every three soldiers, and there were not enough shells for those... I never discussed this specially, but I believe that the awareness that the trouble must not be repeated and that the homeland should be genuinely defended has lived in me since childhood.

After completing the institute, I ended up at the OKBT and, as they say, "moved up the entire ladder." For two years I was deputy to Zhofef Yakovlevich Kotin, and then replaced him in the post of chief designer. Naturally, a number of years for me were associated with the T-80. The tank was put in service in 1976 and continued to be improved. In 1978, it underwent a major upgrade. It underwent another in 1984 and became the T-80U.

[Lisochkin] The T-80 is called your "brainchild."

[Popov] I think that this is an inaccurate word. I will not minimize the role of the general designer; it is important for a special design bureau of any specialization. But he is not the "inventor." The machine is created by a collective of designers, talented people, and each person's contribution is extremely important. This is understandable. Second. We depend directly on the successes of specialists of related sectors. Our tank would not have been possible without the Izhorskiy armor or without the engines from the Klimov Association. Lastly, the achievements of fundamental science and its centers such as Fiztekh, GOI, and others play one of the most important roles. This is the primary basis for any experimental design work. Thus, it would not be an exaggeration to say that the T-80 is the "brainchild" of the entire nation.

[Lisochkin] Its appearance in Abu Dhabi became a sensation. Tell us how the demonstration went.

[Popov] The British built special training grounds there with a fairly complex terrain and antitank obstacles. The American Abrams tank went first. It was not very successful. It began to slip down at one of the obstacles, but the crew handled it and was able to straighten out the tank. It got hung up on top. That was nothing special. It happens. And we merely felt sorry for the Americans. Then our armored personnel vehicle and self-propelled gun covered the terrain normally. The T-80 appeared after them.

Unforgettable minutes. At high speed and with armament operating (all systems were turned on), the tank executed complex maneuvers and literally jumped and danced on the obstacles. The audience—the highest representatives of civilian and military authorities, designers, experts, intelligence officers, and journalists—began to literally explode with applause.

After the demonstration, a sheik approached the tank and asked that the demonstration be repeated. And we did an encore, with the same success. It was interesting to observe how the sheik and his retinue moved closer right up to the path so as not to miss all the details of the vehicle's actions.

[Lisochkin] A demonstration is a demonstration, but the matter is still deeper. I refer to the statements of the highest representatives of the U.S. Army command. Now they say openly that there was not a single military sector in Russia that they tracked as closely as the tank building sector and that the technologies used by the Russians is unique. It is pleasant that there is neither malice nor irritation in these statements of the high professionals; on the contrary, there is respect and even some admiration. Still, how is our T-80 better than the tanks of other countries?

[Popov] Let us begin with general characteristics. The weight of the American Abrams is 62 tonnes, and its engine has 1500 hp. Accordingly, our tank weighs 46 tonnes and has 1250 hp. Our tank is compact and due to less inertia is more mobile. True, in conversations the Americans tried to convince us that their tank is roomier and "more comfortable." But I think that you will only get lumps on the obstacles with such "comfort." I am convinced that our somewhat "crowded" crew conditions is more advisable.

The working out of modern systems is of considerable importance. For example, the French are practically just beginning to introduce automatic loading. We solved this problem a quarter of a century ago. There is another thing I want to be sure to mention. The T-80, besides the main engine, has a small power unit that ensures the constant operation of all onboard systems and in the defense makes it possible to detect the enemy very early.

Its advantages in armament are also considerable. The tank carries guided missiles that have a range of up to 5000 meters. If you picture a meeting tank engagement, the T-80 begins to hit targets from a distance that is twice as far as the enemy in front of it. In addition, it can

defend itself against helicopters. It can hit a hovering, attacking helicopter with a guided projectile from the gun at a distance of up to 5300 meters. The tanks of other countries have nothing like this.

There are other qualities that are difficult to describe with figures. Our tanks have always been known for their high reliability, plainness, and durability. In combat conditions, these qualities become simply fundamental.

[Lisochkin] But given such remarkable data, a contract was not signed in Abu Dhabi... On the second day, the French Leclerc tank was covered with the UAE flag. And this is 436 vehicles, \$3.5 billion. Therefore, we had to encounter the following assessment: "we showed off and went broke."

[Popov] If you are going to talk about "going broke," this applies more to the Americans, who did not hide their annoyance. The region where we were located is traditionally oriented on American and West European arms producers, so they had definite hopes... But we were calm about everything. The point is that deals are never concluded at the first showing. They serve only as grounds for further negotiations, which sometimes last for years. The interests of the parties are determined, their security, and lengthy testing of models in local conditions is conducted. The sums of the deals here, as a rule, are astronomical, and no one is about to take risks.

I will not hide what the commander of the UAE Ground Forces told me: "Everything is wonderful. But you are a couple of years late. We asked you before, but you declined. Why?" The French have been wording in the Emirates for nearly four years and deserved to win. Although the Leclerc is just beginning to enter regular production...

But here is a fact for you. After Abu Dhabi, we received an invitation to go to Dubai. We showed the T-80 there, too. We heard that the local government is still deliberating and in about two months will come out with a tank proposal for Russia. So, I hope negotiations will take place. We will sell tanks.

[Lisochkin] Especially since there is experience here—four copies were already sold. It is a scandalous story. Even though this is not very pleasant, tell our readers about this yourself.

[Popov] Sometime in late 1991, the proposal came up to sell several tanks in Morocco. I opposed it: it is stupid and lacking in prospects to sell on the spur of the moment and in such a small number. But someone put pressure on someone in the government, and the tanks were sold. Fortunately, we had time to remove the built-in dynamic protection system from them.

Neither our foreign intelligence nor the State Intelligence Directorate have been able to ascertain the fate of the firm that acted as the middleman; it simply dissolved. But then, it became clear where the T-80 tanks actually ended up...

[Lisochkin] For testing in the hands of experts... Is this dangerous?

[Popov] It is unpleasant, no more. You see, from someone else's design they can, at best, "steal a few small things." Direct "copying" is impossible. Remember the last war. Both sides, both we and the Germans, had captured models of weapons, but we manufactured in our own way. The economic potential, equipment, technologies, and traditions of any country have such characteristic peculiarities that it is economically disadvantageous to copy "someone else's" models. It is cheaper to buy them.

The external appearance and the descriptive portion provide little. At Abu Dhabi I inspected the Leclerc in detail and talked with its chief designer, but I did not learn anything new. In the defense industry it is not "what" but "how" that is important. I will give an example. I mentioned dynamic protection. In foreign tanks it provides protection for the crew from the shaped-charge jet of molten material. In our tanks it provides protection from the shaped-charge jet of molten material and a subcaliber projectile. Understandably, in the Emirates I was repeatedly asked: "How were you able to achieve this?" I just threw up my hands: "Know-how..." This indeed a secret.

Without a great deal of advertising, "Oboroneksport," the command authorities of the Armored Troops, and "Spetsmash" have already conducted negotiations on sale of the T-80. They were successful, and we were able to sign a number of documents. But in 1992, our partners from various countries began to curtail the negotiations and pull out of them. The reason turned out to be trite: a demand of the U.S. State Department... The Americans ascertained that we might be dangerous competitors for them and pushed all the levers.

[Lisochkin] Our economists, tirelessly talking about "free trade" and "competition of producers," seem to me sometimes to be starry-eyed and day-dreaming and sometimes complete idiots. On any market, regardless of its size—global or "Shanghai" at the subway station—laws are dictated by the one who has had time to become established. It is well known what kind of methods the Americans are now using to squeeze us mercilessly on the world market of nuclear and space services, precisely in those areas where Russia's achievements are indisputable. But will we be able in such conditions at least to regain the positions in arms sales that we have lost?

[Popov] I believe that it is not that the "foreigners want to weaken and ruin Russia." Each defends his own interests as he can. You see, this is an opportunity to develop and improve industry, create new jobs (which is especially valued in any normal country), and ultimately it is the welfare and well-being of the state.

It is worth fighting. We also have considerable chances. You see, the main thing is quality. Mikhail Kalashnikov's assault rifle was able to conquer practically the

entire world... Therefore, it is worth looking with optimism at the prospects of selling not only tanks but also other types of arms and systems.

[Lisochkin] If we talk about tanks, "are we ahead of the planet" in all directions? I ask this because Georgiy Nikolayevich Samarin, being commander of the Rzhev Test Range, once told me that failures also took place during the years of the "nuclear euphoria," when a number of traditions of the famous T-34 were lost.

[Popov] Well, this was when our dear Nikita Sergeyevich [Khrushchev] launched the cruiser on pins and needles... Having gotten its hands on the most powerful hydrogen bomb, our government then decided that nothing more was required and that conventional arms simply were no longer needed. It was a shameful, flagrant strategic military-political error which competent people could not prevent. If you remember, the Americans immediately began implementing the tactic of local wars using conventional arms, and we with our nuclear "club" ended up in an idiotic position because we could not provide real assistance to our allies and partners.

That was how it was. Many of the most important military developments were halted. Then we had to disentangle all this and catch up. We more than succeeded in some things. But there are directions where the consequences of the Khrushchev policy are still felt to this day.

Also, do not disregard the following: talented people are working in tank building in various countries. The French, for example, have made considerable progress in the area of thermal imaging. Our devices (I compared them) are not as good. It is difficult to improve them in connection with the "sovereignization" of the republics, which has severed not only economic but also scientific ties. There are hopes for mutually advantageous cooperation with the French. I also must note the high degree of computerization of American tanks; all the necessary data are reduced to one display.

Tanks with air conditioners were shown at Abu Dhabi. They are simply essential in the tropics, but we have not yet installed them. Another example. Imagine a tank gun under the tropical sun. Heating up, it naturally deforms and warps. On foreign tanks there is a laser device which monitors the bore and automatically adjusts the sight. We do not have this. Although we could... In short, we are not conceited. I believe that we should not be ashamed about learning from anyone.

[Lisochkin] You mentioned "normal country." Are the Emirates a normal country? What are your purely outward impressions?

[Popov] Certainly, they are. I returned from the feudal country as if from our "communist tomorrow." They have the highest standard of living and an abundance of any goods. Incidentally, no one drinks vodka or other

alcoholic beverages; they are forbidden. On perfect roads there are no police or state motor vehicle inspection, and the traffic flows flawlessly.

There are a great many companies, from large to the smallest. And they are all working constantly. Even when a seller offers you a glass of juice, you understand that he is proud of his job and his work.

There are many newcomers—Hindus, Pakistanis, Koreans... But public order is maintained perfectly. I was told that the foreigners work in teams, and if only one violates something, the entire team is put on an aircraft and sent to its home country. There are no problems.

They say that the main reason is the "petro-dollars," money received from the sale of oil. Having observed and discussed this, I came to a different conclusion: it is not a matter of the money itself, but how wisely and reasonably it is invested and used. Most of all, we do not have enough of this wisdom in our country.

[Lisochkin] You returned to economic chaos and ruin. It is easy to assume that the situation in tank building is the same as everywhere...

[Popov] Production of the T-80 at Kirovskiy Plant has been stopped, quite some time ago. It still continues in Siberia, but on a more modest scale. Meanwhile, to lose this production facility is a crime before the people and before the state.

[Lisochkin] But how can it be preserved?

[Popov] Certainly, there are ways. If you like, I will cite the American experience. Don't think that there are all clear skies in the United States; they have their share of economic problems. The tank industry is threatened with the loss of potential, since the deadlines for development of the "Block-3" advanced tank are being delayed for quite well-founded reasons. The question is being discussed in Congress. And the question has been posed only this way: How to preserve the potential?

A number of measures have been approved. These include exporting tanks to Saudi Arabia, Kuwait, Egypt, Oman, Pakistan, and Sweden. The M-1 tanks will also be modernized with the creation of the M-1A2 on their base (3000 units over the next 9 years). It is calculated that this is economically advantageous, since the cost of the modernized M-1A2 is two-thirds the cost of producing a new one. Thus, the industrial potential is being preserved, and the combat capabilities of tank units are being increased.

As you know, such problems are not discussed in our congress. They have other concerns.

[Lisochkin] Recently, I drove an Abrams for a fairly long time. The computer game "Abrams: Tank Battle," produced in the United States in 1989. First the computer familiarized me with the characteristics of the tank and offered a choice of ammunition. Then I had to engage in combat, return to base for refueling... It is fairly complex,

and I did not do very well at first. An officer who appeared on the screen admonished me, cursed, pounded his fist, and once even threatened with a pistol. Then I mastered the buttons and began to "crack" the Soviet BMP's and T-72's fairly successfully with the Abrams. What do you think about such games?

[Popov] They are all right. For many years we considered such games to be "militarization of childhood." And in vain. Boys will always play war games, and girls will always play with dolls. This is human nature. The fact that the Americans are propagandizing their military equipment is absolutely correct. It is too bad that we do not do this...

You know, you have gotten me interested. In St. Petersburg we have very high-class computer specialists and programmers, and it would be curious to create such a game for the T-80. True, it would be more complex, taking into account the tank's capabilities. But that is also what would make it interesting. In any event, if the idea goes any further, I think we would be willing to provide the basic specifications and performance characteristics for both the T-80 and tanks of other countries.

Although, of course, we should count on computers for more serious things...

[Lisochkin] What kind of things?

[Popov] It is hard for you to imagine, but for several years now we have been existing as if in a kind of vacuum. Before, under the vigilant "eye of the state," we were sometimes cursed and sometimes praised. Perhaps not always fairly. But that was life. Today, simply no one is interested in us.

But, you see, we are not loafers. I can show you a whole tape of photographs of models of tracked equipment for purely civilian purposes which we have developed as part of the conversion. Should we work on these? Or tanks? Or something else? In what proportion?

I catch government officials by the sleeve and ask them: "Do you need tanks or not? If you do, what kind and how many? Just answer: Yes or no?" And I cannot get an answer. At best, they console me that Russia's military doctrine has not yet been drafted...

[Lisochkin] An absurd situation.

[Popov] But it is the real situation... They do not joke about such things. And I am by no means exaggerating.

[Lisochkin] On what do you rely?

[Popov] The first and foremost task is to preserve the scientific and technical and design potential as much as possible in conditions of the crisis. After that, I rely on the natural course of events. Under any circumstances, Russia will remain a great power. This is predetermined for it historically. A power cannot exist without an army, which is the guarantee of statehood. And there is no army without modern tanks. We will overcome here!

Nizhniy Tagil Plant Converts to Machine-Building Complex

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[Article by Valeriy Pomazkin, Nizhniy Tagil, Sverdlovsk Oblast, under the rubric: "Conversion": "Tankograd: Yesterday, Today, Tomorrow"]

[Text] This enterprise was kept in the "shadows" of other Urals industrial giants for five decades. Eight lines are devoted to it in the GUINNESS BOOK OF WORLD RECORDS: "Urals Rail Car Production Plant, Nizhniy Tagil, Sverdlovsk Oblast, USSR, the production buildings of which occupy 827,000 square meters of floor space, is the largest industrial enterprise in the world. Annually, besides rail cars, this plant can manufacture 2,500 T-72 tanks."

Half a century of secrecy of the Nizhniy Tagil Military-Industrial Complex and the last two years—that much time was required to prove: the defense enterprise is becoming a leader of native conversion machine-building. The presentation of Uralvagonzavod State Association's output that occurred recently in Nizhniy Tagil confirmed that.

After the entry formalities, they admitted our bus onto the territory of Urals tankograd [tank city] through the hinged gates of Uralvagonzavod's main transport checkpoint. The first impression: movement along the wide Nizhnetagil avenue continues, it's as if the streets here are more well-groomed than in the city. A "Gaipnik" [state automobile inspection officer]—a captain who was upbraiding a motorcyclist on the side of the road—who came from heaven knows where added to the illusion of a "civilian enterprise".

Our "assault" of journalists and television camera operators "landed" in tankograd on the occasion of the presentation of the peaceful output that had been mastered by Uralvagonzavod during the last two years. The bosses had painstakingly prepared the demonstration of, as they say, personal goods. A diverse collection of all sorts of equipment was located on a reviewing square near one of the production buildings.

And there was a lot to look at! A "PUM" all-purpose small loader, demonstrating its small turning radius, maneuverability and speed, gyrated in place like a top. The vehicle abruptly left its location at full speed, rapidly gained a decent speed, and nearly traveled on its rear wheels. On the neighboring square, an extraordinary type of excavator raised a cubic-meter capacity bucket to a six-meter height and smoothly lowered it, [unreadable] to close by a steel tooth... and placed an opened match box on the asphalt. It seems that it managed to do that on the second or third attempt. Association Chief Engineer Mikhail Shpak commented that this trick, that was shown in China, turned out to be a contract for delivery of 50 Urals hydraulic excavators to the PRC [People's Republic of China].

The Past: "The Armor Is Strong and Our Tanks Are Fast"

Uralvagonzavod was built during the years of the first five-year plans. The first cargo gondola cars left the plant's conveyor belt in the autumn of 1936. The first tank—the legendary T-34—was already being assembled in December 1941. Besides tracked vehicles, the plant supplied aircraft bombs, parts for Katyusha rocket mortars, and other special products to the front.

For more than half a century, the plant was the primary supplier of tanks of various modifications for the country's Armed Forces. The output of rail box cars resumed in 1946 and the plant began to fulfill orders for the space department from the early 1950's.

Uralvagonzavod, the production of which was structured according to the principle of a closed technological network having its own open-hearth furnaces and electric furnaces for smelting steel and modern equipment to obtain cast bars, forgings and dies weighing from 50 grams to five tonnes, can ensure fulfillment of all production processes—from cold steel-sheet forming to assembly and testing of finished products. This all-purpose industrial-technological specialization is best suited for the plant in a period of the disintegration of horizontal production ties and has permitted it to assemble the production of many component parts at one location.

The turning point occurred two years ago with the adoption of the State Conversion Program. Already at that time, Uralvagonzavod General Director and Russian Federation Supreme Soviet and Ministry of Defense Military Council Member Vladimir Seryakov, in contrast to some of his other defense industry colleagues, understood: This is serious and lengthy conversion. Despite the program's many inadequacies and its declaratory nature, already two years ago they decided not to waste time at Uralvagonzavod. Emphasis was placed on the development of its own KB [Design Bureau] and existing technologies.

Soon design documentation was developed and the first test models of the all-purpose hydraulic excavator, in the design of which were set forth technical solutions while considering the experience of tank production, were manufactured in cooperation with Voronezh's "Tyazhels" PO [Production Association].

The Present: Based on Tank Design Bureau Technologies

Yes, from the very beginning the Urals rail car makers bet on what was always their strong suit. The utilization of existing developments permitted them to rapidly master civilian equipment of a high technological level and to save quite a bit of resources. If at many converted enterprises today you need to invest up to 10 rubles worth of resources for a ruble of mastered civilian output—that is the price of the transition to "peaceful

rails", the Nizhniy Tagil workers have managed to reduce these expenditures by a factor of 3-4.

Eleven months was spent on the hydraulic excavator and more than one year would have been required under other circumstances. Today production of that vehicle has been placed on a conveyor. Having a bucket with a 1.25 cubic meter capacity, it can remove dirt from a depth of up to six meters, raise the bucket with dirt up to that same height, and operate without a failure in a temperature range from + 40 to - 40 degrees. The excavator has turned out to be successful and, based upon technical specifications, does not lag behind the machines in its class of such well-known firms as Hitachi (Japan) or Caterpillar (United States).

Nine months were required to place a portable loader that was developed based on a prototype of the American "Bobcat" into series production. This work was carried out in cooperation with Sverdlovsk's "Pnevmostroymashina" PO that developed a hydraulic rig for a small diesel. The machine was developed from "zero" and practically through their own efforts. Uralvagonzavod General Director Vladimir Seryakov already in the middle of last year attempted to interest the Council of Ministers in this project—on the subject of rendering financial assistance but he also did not obtain any.

Their victory turned out to be all the more weighty. The loader, named PUM-500, turned out to be an all-purpose, maneuverable vehicle with a broad range of application. With its help, you can carry out leveling and clearing of territory, conduct construction and erection work, drill holes and carry cargoes that weigh up to half a tonne. The set consists of a loading bucket, a hydro-borer, hinged forks, a road brush, and a snow blower—and all of that for a little over R3 million, the loader perfectly serves as an all-purpose mechanism for peasant farms and farms, road and utility services and builders. The PUM-500 can do almost everything. And what it can't do today—it will be able to do tomorrow. Soon the loader's set of mounted tools will be supplemented by a loading bucket, a trailer, a concrete mixer, a spike-tooth harrow, a trenching machine, an excavator bucket, a loader-manipulator, a manure gatherer, a mower, and a hydraulic hammer. You can order what you need when you purchase the vehicle and incidentally a network of enterprises is already being created throughout all of Russia to service them. Last year, Uralvagonzavod sold 24 excavators and 300 small loaders. This year the number of excavators with the Nizhniy Tagil trade mark will increase by a factor of 10, and no less than 1,000 PUMs will be produced.

Another vehicle, the MTM-1 Kedr, the lower half of which could easily be surmised to be a tank, also attracted universal attention at the presentation. Developed based on the best medium tank, it combines in itself the functions of an all-purpose transport vehicle, a powerful bulldozer, a primemover, and is designed to transport people and cargoes great distances. This

"tank" with a straight angle bed instead of a turret can negotiate any ford with a depth of more than a meter and carry cargo weighing up to three tonnes.

Several innovations of "traditional" output—freight cars—were demonstrated and generated a great deal of interest among basic sectors of the national economy. Uralvagonzavod, which has recently become a member of Uraltransservis Joint Stock Company, which RAF [not found], BelAvto [not found], MAZ [Minsk Automobile Plant] and GAZ [Gorkiy Automobile Plant] also joined, developed a specialized gondola car to transport automobiles. The rail car can also serve as an all-purpose container. Developments of recent years are—a four-axle tank car for transporting gasoline and light petroleum products with a cargo capacity of up to 72 tonnes, 125-cubic meter flat cars for transporting lumber by rail, an all-metal specialized box car, and a tank car for cryogenic products. Economic feasibility compelled the Nizhniy Tagil workers to significantly augment the fleet of rail flat cars. Ukraine previously had a monopoly on tank car production—now it is already a different state. We purchased lumber cars from the Finns—over 100,000 American dollars per car. After a nearly two year shock, MPS finally regained consciousness. Throughout Russia, the shortage of rail tank cars is nearly 60,000 and the Urals rail car builders promise to supply up to 3,000 tank cars annually, that is miserly but for now they are having to count exclusively on their own efforts. Uralmash, Volgodonskiy Atomash and other industrial giants are promising support.

In a word, Nizhniy Tagil rail car production corresponds to Western standards in many parameters and they exceed them based on several indicators, especially those concerning safety of travel and durability. It's no accident that French and German rail car building firms have proposed cooperation to Uralvagonzavod.

The Future: "30% Defense Output Plus 70% Civilian Output"

At a press conference, Vladimir Seryakov noted that if in the recent past the ratio of military output to civilian output produced at Uralvagonzavod appeared to be 70 to 30 (in percentages), today those figures have changed places. In other words, only a third of output produced will end up under the column of "special equipment".

This year the association plans to produce R3.5 billion worth of consumer goods alone (excavators, loaders, rail flat cars and tank cars are not part of that). The presentation of civilian products at Uralvagonzavod concluded with a visit to a TNP [consumer goods] exhibition, the assortment of which turned out to be quite broad—from electric stoves to mini-beer plants.

Familiarization with the latter began with a short historical digression. An order to develop a beer plant was received from the union ministry of light industry (Minlegprom). At that time love had still not reached epochal scales and the plant turned out to be cumbersome and consumers were not found. The Nizhniy Tagil plant

workers studied a similar product that was being produced in several European countries and they developed another variation of a compact mini-beer plant which could be installed in a 150 square meters of floor space. A total of two operators could service it. Uralvagonzavod entered the "Rossiyskoye pivo" [Russian Beer] Joint Stock Company and had already produced and sold 11 of these beer plants last year. The enterprise provides an equipment assembly chief on site, trains servicing personnel, and supplies the beer plants with raw materials. The entire technological cycle of beer production is totally automated.

The tour through the consumer goods exhibition took an entire hour. There really was something to see. A comparatively cheap bottle-gas driven apparatus for "Volgas", "Zhigulis", and "Moskvichs", "Malakhit" kitchen processors, "Ogonek" electric [unreadable], "Berezka" kitchen furniture sets, "Neyla" entry way furniture sets with decorative bronze plate, fruit containers and many others that were assembled in one hall formed the competition, based upon the assortment, with any reputable department store. And all of this is produced in series production and in significant amounts. The automobile bottled-gas apparatus is produced in the amount of 7,000-10,000 sets per month, various sports simulators—based on orders, practically without limitations, and all of this at a price that is approximately 40% lower than for a similar product produced at other Urals enterprises. And the Nizhniy Tagil conversion workers are continuously improving their goods. One of the latest goods—a practical blow torch—is a characteristic example of that. The developers placed the nozzle vertically on the torch and it has turned out to be a totally irreplaceable item for drivers, geologists and tourists who work under conditions of the North.

The stylized silhouette of a flying bird in the background of a globe and below the words "Sila stabilnosti" [Strength of Stability] are depicted on the Uralvagonzavod State Production Association firm trade mark.

SHIPBUILDING AND NAVAL ARMAMENTS

Impact of Loss of Shipyards to Other Republics

93UM0534B Moscow KRASNAYA ZVEZDA
in Russian 17 Apr 93 p 4

[Article by Vladimir Maryukha, KRASNAYA ZVEZDA, under rubric "Defense Complex": "The Navy-Shipbuilders' Bond Must Not Be Broken"]

[Text] *In the first postwar year the newspaper KRASNYY FLOT submitted projects for the People's Commissariat of the Navy Club which were to embody the idea of glorifying the Navy by means of clubs, gymnasiums, swimming pools, and one-hundred meter obelisks. Even to this day the Russian Navy Main Staff has none of this,*

although in my view the best monument to the Navy is the Navy itself, and it is created not by architects and sculptors, but by shipbuilders.

But many "cracks" have appeared specifically on this "monument" of late. In the opinion of many with whom I had occasion to converse, the first "bell" sounded when shipyards were told to shift to self-repayment and self-financing during 1988-1989. As a result, naval SRI's which were engaged in developing ship equipment received the right to conclude contracts directly with the enterprises building these ships. These SRI's also were given control over the quality and course of construction. And just who is interested in essentially supervising themselves? At the same time there was a rise in prices of products of counterpart enterprises—it was unprofitable for them to produce military "articles" usually put out in small lots.

Shipbuilding received the second blow with the Union's disintegration. At a stroke the Navy was deprived of the greater part of its shipbuilding and ship repair base. In Ukraine alone there remained the following: the Black Sea Shipyard, where domestic air-capable ships were born; the Yard imeni 61 Communards in that same Nikolayev (guided missile cruisers and large ASW ships); the Kerch Zaliv Yard (patrol ships); and yards in Kiev and Feodosiya (small ASW ships and surface effect ships). Counting plants supplying set-making articles, a newspaper page would not suffice for the list of losses. And yards also were "lost" in Baku, Yerevan, Kazakhstan, and Belarus...

Russia was left only with three yards capable of building large surface combatants: Yantar in Kaliningrad and the Northern Yard and Baltic Shipyard in St. Petersburg. But military orders are even unprofitable for them. This is understood in the Navy Shipbuilding Directorate (it was deprived of the descriptor "Main," but has not ceased to be the main client for Navy ships), but it cannot help the shipbuilders in any way.

"We are only a transmission link between government and yards," said Captain 1st Rank Gennadiy Stupin, chief of the Large Surface Ships Department, in a conversation with me. "Shipbuilding programs are approved by the government and it also allocates funds to pay for naval orders—the Navy does not have its own money."

What is a yard to do, though, when work already has been done, but funds have not been transferred? Or when, for example, it is not authorized to transfer money to contracting parties before products are received, but they demand prepayment? And prices? The cost of work is determined in the first quarter, but the money, already devalued, arrives at year's end... This is only the visible tip of the iceberg of problems which, I repeat, are finding understanding in the Navy, but it is not within its powers to break this vicious circle.

Navy men also agree that shipyards are taking conversion orders into their portfolios for which there also should be

state subsidies. All this now "is not to the detriment" of Navy orders. The fact is that the shipbuilding program has been corrected repeatedly toward a reduction, and not just in the number of ships planned for the order—entire advanced directions of shipbuilding have disappeared. Thus, not one cruiser will be laid down in Russia before 2002, but the fact is that specifically ships of this type always have been the striking power of a surface fleet. Destroyers, for now still on "paper," went "under the knife" (fortunately not all of them), and the division on air-capable ships has been totally eliminated. True, as Gennadiy Vasilyevich Stupin explained, there still remains the hope that they can be created through a separate state program, as now is being done in nuclear powered submarine shipbuilding.

But for now not one large surface ship has been laid down on yard ways and work has been suspended on certain objects under construction. Meanwhile, the present ship inventory will be hopelessly out of date by 2000, and it will be necessary to remove essentially all ships from the Navy order of battle which make up the main surface fleet forces today. And the Navy will receive 20 (at the most, 30) destroyers and ASW and patrol ships in exchange (and then under the most favorable circumstances). Even operating until worn out, they will not be physically able to perform missions being performed by ships now in commission.

It is understandable that it is useless to call on the patriotism of shipbuilders today and ask them to build on credit and sell ships to the Navy for next to nothing. Even so, existing military orders are a burden for shipbuilders: to fulfill their obligations to the Navy, enterprises get into debt to the state by taking credit and interest which navy men are incapable of paying off.

A solution could have been found in competitive designing and building of new ships for the Navy. The Navy Shipbuilding Directorate already is attempting to introduce such a practice with respect to designing. But the fact is, it is necessary to pay even for developing competitive design projects, and our shipbuilding enterprises simply cannot afford competitive construction of models, which firms throughout the world do at their own expense in hopes of future profits.

If we take Navy history from Peter to our days and illustrate it on a chart, where the Navy's quantitative makeup and qualitative state corresponding to a given epoch are shown vertically and development stages horizontally, it will turn out that the last peak falls on years now being called stagnant. It is understandable that it was not because of a good life, as they say, that the country was forced to maintain military parity with almost the entire world by straining itself to the utmost. Today no one insists on this, and it even would be absurd. But the fact is, since then the curve of the Navy's makeup has been steadily heading toward zero. At the very least, contracts have been let with shipbuilders for 1993 for building only those ships without which the

Navy simply cannot get by. Therefore we can speak not about its revival, but only about reducing losses to obsolescence.

History knows many instances where, having lost their fleet, great powers also lost their political influence, for which only mellifluous statements and declarations are not enough, with all ensuing consequences. One would like to believe that despite the colossal slump in military orders and all their unprofitableness, shipbuilders still understand that if the Navy is strong, Russia will be strong and they will have both world shipbuilding authority as well as profits. In any case the "Navy-shipbuilders" bond, which has grown strong over the centuries, must not be broken just because none of us are experiencing the best of times.

Impact of Budget Cuts on Shipbuilding

93UM0534C Moscow KRASNAYA ZVEZDA
in Russian 17 Apr 93 p 4

[Article by Aleksandr Yegorov, KRASNAYA ZVEZDA, under rubric "Defense Complex": "Facts and Figures"]

[Text] According to data of the Roskomoboronprom [not further expanded, possibly Russian Committee on the Defense Industry] Main Information and Statistics Directorate, the difficulty of the economic situation in Russia's shipbuilding industry in 1992 was dictated above all by the following: the overall drop in solvency of general clients, including civilian clients—Maritime Fleet, River Fleet and others—which did not award around half of the contracts; shallowness of the sector's conversion (35 percent); and of course, inflation processes, because of which the increased prices for purchasing raw materials and basic supplies essentially outstripped the increased prices of sales by an average of at least tenfold.

The real volume of "military" products continued to drop and was 65 percent of the 1991 level.

The volume of "civilian" products stayed approximately the same (95 percent), and rose noticeably for some kinds (refrigerators, electrical household appliances, medical equipment), which produced a 2-3 percent increase by year's end.

Compared with other defense industry sectors, the highest wage in the shipbuilding industry was R18,500, with the average being R15,000 for defense industry sectors. For this reason the outflow of cadres from the shipbuilding industry in 1992 did not exceed 11.7 percent, the best indicator in the defense establishment.

Some first quarter results for this year indicate a slowing of rates in decline of production. They now are below average rates for the sectors. The planned development of the civilian sector, prospects for obtaining a military order, and also restructuring being conducted in the sector permit counting on a more stable situation in the current year than in 1992.

Privatization Spurs Prospects for Making Nuclear-Powered Vessels

93UM0534D Moscow KRASNAYA ZVEZDA
in Russian 17 Apr 93 p 4

[Article by Vladimir Gundarov, KRASNAYA ZVEZDA, under rubric "Defense Complex: Voice of the Yards": "Severodvinsk Machine-Building Enterprise: There Will Be Submarines!"]

[Text] Conversion did not bypass even a giant of submarine shipbuilding such as the Sevmash PO [Severodvinsk Machine-Building Enterprise Production Association]. Boris Yeltsin's edict establishing the Russian State Nuclear Powered Shipbuilding Center headed by the Sevmash PO based on four enterprises of the Severodvinsk shipbuilding complex saved the unique yard. Severodvinsk shipbuilders thereby not only got a chance to survive, but also acquired prospects for development.

The Center was formed to perform tasks of a state nature. The main one is to carry out a unified technical policy in creating submarine and surface ships with nuclear power plants; ensure them of warranty inspection, repair and recycling; and also put out highly reliable, science-intensive machinebuilding products. In the words of Fedor Shusharin, Sevmash PO chief engineer, despite the cessation of budget appropriations for research, 357 (!) measures of the plan for retooling and upgrading the industrial process were realized last year. Vice Admiral Venomin Polyanskiy, chief of the Navy Shipbuilding Directorate, noted that today Sevmash is not only the most advanced Russian yard making nuclear powered submarines, but also an association which has achieved their lowest production cost. Sevmash is at the level of similar U.S. and European yards in technical outfitting and surpasses them in some things. For example, the degree of mechanization of hull assembly and welding work here reaches 97 percent, an indicator which has not been achieved in a single world shipyard.

At the present time the "Statute on the Center" is in the government for approval. Interested departments are readying a draft government decree on further development of enterprises and associations included in the Nuclear Powered Shipbuilding Center and also on development of the city of Severodvinsk, with consideration of giving it the status of a territory for priority development and closed administrative-territorial formation. This means billions of rubles in the form of taxes on enterprises will remain in Severodvinsk and will go for social and medical support, education, culture and other city needs.

The planned direct subordination of the Center to the government will give the shipbuilders greater rights and an opportunity to independently define and implement technical policy in building submarine and surface ships. The very preparation of production will change. Northern shipbuilders intend to bring rates for building surface ships close to the level of western countries.

Work is underway on Navy orders in parallel with implementation of the program for building surface ships. There also is a long-range program being studied in the government for utilizing main production capacities. Russian Federation Minister of Defense General of the Army Pavel Grachev, who visited the Center for Nuclear Powered Shipbuilding in early April, assured workers they will not be left without Ministry of Defense orders, and defense products will comprise around 60 percent on the whole.

Shipbuilders also will have to master the output of crane vessels with a large load-lifting capacity. And construction of mini-bulk carriers for Germany, gas carriers for England, and barges and tugs for Holland have been included in the commercial shipbuilding program for the first time.

Another no less serious direction in the shipbuilders' work is mastering construction of equipment for oil and natural gas production in polar latitudes. In the words of P. Balakshin, head of the Arkhangelsk Oblast Administration, shipbuilders will be provided with such orders for the next 50 years, which is of vital importance for the city of 270,000 and its shipbuilding enterprises.

According to the concept of its leadership, old experience of building nuclear powered submarines will be used to the maximum extent in the "civilian" construction of Sevmash. This means 40 percent of production capacities activated under the conversion program will retain their high S&T potential.

Problems in Recycling Nuclear Submarines Outlined

93UM0528A Moscow KOMSOMOLSKAYA PRAVDA
in Russian 20 Apr 93 p 2

[Article by V. Karkavtsev: "Last Harbor for a Tired Submarine: Sawing Up Nuclear Submarines Is an Expensive Pleasure"]

[Text] Arguments are occurring in Severodvinsk: to leave the city open or to restore the border access regime with which they have lived here for several dozen years. Each variation has its adherents: nuclear submarine builders advocate restricting access to guests and the rest of the residents who work in the civilian sector advocate unrestricted access into the city. "We need to protect secrets," argue the former. The latter respond: "If we close ourselves off—we'll remain on the market's sidelines."

We can understand those who wish to restore the border regime—under it, an elite city lived heartily and comfortably. Furthermore, ecologists and reporters have now begun to visit here more frequently and persistently ferret out information on the radiation situation. But what can the radiation situation be like if 18 obsolete submarines with loaded reactors are right in the center of the city. How long they will be there—God only knows.

Today the dosimeters alongside them aren't acting up but what can happen tomorrow?

There were more written off submarines. Last year, they began to cut them up for salvage at Zvezdochka Plant. The work is as follows: They cut out the nuclear reactor, remove the missiles, they connect the bow and the stern and throw the shortened boat back into the water. Why this long drawn-out affair, can they really not scrap the entire submarine at the same time?

"We can. And that would be more rational. However, we have strict time limits that have been approved at the intergovernmental level: so many missile compartments must be cut up off by such and such a date. If we cut up the submarines entirely—we will be knocked off schedule then and there," says Association General Director N. Kalistratov.

Just this semi-anecdotal fact that we heard at the dock attests to how strictly this schedule is being monitored. One of the submarines was sitting at the wharf in an already cut up state. The missiles had been extracted from its launch tubes just like it was proposed in the schedule. There was bad weather, sleet was filling them up, and workers covered the hatches of the empty launch tubes with small sheets of plywood in order to protect the compartment from dampness. The Americans were watching from space: there is disorder, the hatches have been closed, those Russians are somehow trying to be clever. There is a telephone call to the plant from Moscow: "Why have you not yet unloaded the missiles from some 'item'?" "How could they not be unloaded, everything is according to schedule." "But the hatches are battened down!" They dashed over to inspect—so the clever Americans had caught sight of the plywood panels from space...

But then again, no matter how strict the monitoring is, the scrapping of submarines could cease. Zvezdochka still hasn't received a kopek for this work since the beginning of the year. They also did not pay it last year: while we were there, the director appealed to Moscow three times in one day—for the time being there are only assurances. The cutting up of the submarines is continuing thanks to credits and civilian orders, but that is a short song—the energy workers whom Zvezdochka chronically does not pay could go out on strike at any moment and the plant's power supply would be cut off.

It would seem that the Severodvinsk residents' attempts to reach the wharves could finally be resolved happily—the Russian Minister of Defense recently visited here. But if Pavel Grachev would himself sign the financial papers... This is what has happened: They allocated a separate item in the state budget for weapons scrapping expenditures. Naturally, as things occur in our country, new staffs were immediately approved in the Navy under that item. The old system of interrelations has been disrupted and the new Moscow structure, as a plant worker expressed it, "is conducting itself like a cow on ice."

Problems with payment, the unclear prospects with military orders—naturally all of this is having an impact on the plant's social climate. Here's some information that struck us: Zvezdochka is in 14th place in the city based upon average salary—here a lad gets 15,000 rubles a month (compare—energy workers get R54,000).

"It's as if someone has specially set as his goal to destroy the navy," says Kalistratov with annoyance. "Civilian customers have no problem with prepayment but we can't get our money for months for military output."

People are leaving. Specialists with very precise knowledge whom you can't train in a year or two at a professional technical school, are leaving. The plant nurtured them for decades—and now it can't feed them. Housing construction has already nearly been curtailed. Already resources are being found with difficulty for social programs, for the organization of relaxation and for the maintenance of the village. The director's Volga, in which he graciously drove us to Arkhangelsk, is suitable for a museum display—it has been on the road for 22 years. "Some people will purchase Nissans and Volvos but at our plant money is going for new lathes and for the modernization of production."

God grant they need that, they can't last without modernization! They think that sooner or later the rulers will come to their senses and will remember the navy. The muzhiks, who practically without tools and with just gas cutting tools are cutting up the submarines, gnash their teeth with annoyance for this work—these submarines could have kept on sailing...

And well, since the military-industrial complex isn't feeding them, but, on the contrary, is bringing them to ruin, the plant has been compelled to independently retool a part of production to civilian orders. Recalling with a shudder Gorbachev's "conversion" at the level of pots and pans and teapots, Severodvinsk residents have found their lode: they are taking up the production of tankers for Holland, they are mastering a motor ship-platform for Arctic navigation, they are preparing to build nice trawlers (now the fishing fleet plants are also abroad—in Klaipeda and Nikolayev). In a word, they are attempting to preserve the plant's shipbuilding profile.

This is being attained with difficulty—the navy is undergoing difficult times throughout the CIS. There is a shop at Zvezdochka, by the workload of which you can more or less accurately judge the state of the ship business—the propeller shop. Here the lads fashion blades for the most varied ships—from the river ship Meteor to a nuclear icebreaker. So, there were three shifts at the shop already about two years ago. Right now there are barely enough orders for one shift. "The navy is not being renewed and there is no demand for propellers," the workers say in one voice.

There is another reason—anyone who will take the trouble is trying to ship abroad, by hook or by crook, the ferrous metals from which the workers fashion propellers. One would expect that the Baltic republics will end

up being first in the world in the export of copper and nickel. How is this being done? Recently, shipbuilders from Klaipeda visited Severodvinsk and told us this tale. They currently have three seiners at the dock for routine maintenance. They patched them up at the plant and sent them to sea. And they, under full steam, didn't move at all. It turns out that some looters or other had removed the propellers. During the winter, out of the water!..

But what about those obsolete submarines? First of all, Severodvinsk Committee on the Ecology Chairman L. Kuratov thinks that we need to immediately place the state of the reactors under Gosatomnadzor [State Nuclear Safety Commission] inspectorate control. It's time that we have an idea of how great their reserve of reliability is. Second, as of today there is practically no technology to transport enormous units with radioactive wastes from the city by sea or by rail. Yes and it seems that there is no place to transport them to: this winter the Murmansk authorities banned the unloading of spent nuclear fuel on the Kola Peninsula and disputes are boiling around the construction of a burial site on Novaya Zemlya.

But all of this, as they say, are tactical tasks—how to collect money, how to carry away wastes, where to bury them. Severodvinsk specialists assert that they were engendered at the root of incorrect approaches to the construction and operation of nuclear energy facilities. What are the Americans doing? For example, while designing an AES [nuclear power plant], they initially include in the estimate expenditures for scrapping reactor units. These expenditures are included in the cost of the electrical energy. And when the reactor is obsolete, the "green lawn" principle is employed there, highly radioactive wastes are transported to burial sites and low radioactive wastes are buried in the earth directly on site and they plant trees over it. It's pretty. In our country, will the resolution of these issues begin only when the next Chernobyl or Tomsk is scorched?..

AIRCRAFT, MISSILE AND RELATED INDUSTRIES

Nizhniy Tagil Space Technology Plant to Switch to Peaceful Production

934E0686B Yekaterinburg URALSKIY RABOCHIY
in Russian 30 Mar 93 p 2

[Article by URALSKIY RABOCHIY correspondent T. Konovova, under rubric "Conversion": "Tank Cars Are Not Being Launched Into Space"]

[Text] Nizhniy Tagil. In order for the correspondent of a large newspaper to go through the gatehouse of a top-secret enterprise, something unusual has to happen. And it did happen. The collective that had lived for dozens of years in accordance with a special calendar of spacecraft launches is putting into the market orbit items with a completely different purpose.

"There it is, a major work in terms of conversion," Stanislav Trofimovich Pavlenko said. Pavlenko is the main designer at the Urals Scientific-Production Complex for Cryogenic Machine Building, which is situated on the territory of Uralvagonzavod [Urals Railroad Car Plant]. He is leading me to cylindrical storage tanks that can be housed in a small area. And then this area will already begin being called the beer plant. Immediately one recalls the television commercial that states how good it is to always have fresh beer, thanks to one's own breweries. Because that is the way that the Rossiyskoye Pivo [Russian Beer] Company advertises the Tagil mini-breweries, 50 sets of which are supposed to be produced this year, with a consideration of the demand, which, so far, is not large. In many countries breweries like this have been used for a long time, but in our country the preference is still for the traditional plants.

Well, this has not discouraged the designers. They are ready to propose their equipment designs for large plants also. The "fermentation process," as the people jokingly say here, has started to work. The designers have stated convincingly that, by modifying certain assemblies, it is possible to build equipment to prepare nutritive mixtures. In general, the people here have begun thinking seriously about our nutrition. Together with partners from Yekaterinburg, they want to set up the production of units for cooling and storing food products. That means that berries and fruits, after a "lethargic sleep," will arrive at the dinner table as though they have come straight from the orchard.

"Isn't this too remote from the enterprise's area of specialization," I ask S. Pavlenko, recalling the sweet chewing gum that had been put into production in the course of conversion at a chemical plant and that, incidentally, had not been successful.

"No, the creation of units to use liquefied gas is our main direction, because they are widely used in various branches. We offer power storage equipment for storing gas in liquefied state. It is easier that way to provide the "blue fuel" to rayons that do not have gas pipelines. One place that has become interested in our innovation is the Hermitage. What museum is not concerned about protecting its collections against fire? We proposed a unit to extinguish fires with the use of liquefied nitrogen. But in museums, fortunately, fires are infrequent, whereas at coal mines and oil and gas fields we hear about accidents constantly. So now you will understand that the development of firefighting equipment will engage our designers' minds for a long time."

Minds need support. Otherwise the "brain drain" is inevitable. In addition, we are talking here about the best minds of construction planners and designers who have been fine-tuned to the creation of the most sophisticated space-rocket technology. You will agree that, for a specialist who worked on the Buran system, it is psychologically difficult to switch over to the creation of a milk collector for dairy farms. Also, the guaranteeing of conversion is a very sore spot: the designers of civilian

output have not yet received any budgetary appropriations or preferential credit. Nevertheless they have made a dizzying turnabout, during which 75 percent of the military production orders have been reduced in the overall work volume to five.

"You might notice that this was done without reducing the number of workers, while retaining a complete production workload," I was told at the personnel department. It is difficult to doubt this information when one can see, directly under the windows, convincing proof of this workload standing on the rails—one of the first finished tank cars for shipping petroleum products. The need for them is outstripping the manufacturers' capabilities. Two hundred tank cars will be sent out this year and consumers will receive five times as many next year. There is also an experimental model of a tank car for shipping liquid acid.

"We take on science-intensive developments that are beyond the capabilities of collectives lacking their own KB [design bureau]. And we take aim at a distant target—we want to help enterprises that have suffered from poorly thought-out conversion," S. Pavlenko said, concluding our conversation.

I depart with an ambivalent feeling. A feeling of admiration for the scientific and technical talent of people who were able, without any discernable detriment to their own enterprise, to switch over to the conversion rails rapidly, effectively, and by relying on their inner reserves. But mixed in with the admiration is envy of the commercial talents of the transatlantic creators of spacecraft who are using that technology with even greater effect for the welfare of their countrymen. Recently the radio, reporting on the latest commercial Shuttle launch, stated that the American taxpayers do not begrudge the \$30 billion that the flight program cost. But tank cars do not fly into space.

Problems of Chkalov State Flight Test Center Under Market Conditions

*93UM0528B Moscow KRASNAYA ZVEZDA
in Russian 17 Apr 93 p 3*

[Article by Russian Federation Air Force Press Center Officers Colonel Gennadiy Lisenkov and Major Sergey Babichev: "Russia's Wings. What Will They Be Like Tomorrow? Reflections After a Visit to an Aircraft Test Center"]

[Text] As one journalist joked, we really didn't manage to see a flying saucer during the four days spent at Akhtubinsk... There are many impressions but there is one theme that cut to the quick immediately and from day to day during the course of our familiarization with the State Flight Test Center (GLITs) imeni V. Chkalov that was crystallized in a large and very alarming problem. That is the state of military aviation science, the financing of the sector, and the prospects for its development.

For many years, the Center had the status of a scientific-test institute. It is located on the lower reaches of the Volga among the Astrakhan expanses. By 1985, 22,600 people worked at the institute. The staff, besides a complement of its own scientific subdivisions, included the maintenance personnel of enormous ranges, roads, auxiliary services, and guards. The city of Akhtubinsk and its population of 52,000 were largely supported on aircraft tests. Meanwhile, the conviction had already matured in the former USSR's Ministry of Defense that the 240,000 scientific associates in the army—were an intolerable luxury. As a result, the Center appeared in place of the Institute.

What did the change of status portend? Right now the GLITs does not have the majority of its former incentives and there are no positions for leading, senior or junior scientific associates. The problem of preserving a scientific council at the Center is being urgently raised. But even that is not the main thing.

Year in and year out the number of aircraft tests is decreasing. Now you can't use a kalach [roll] to entice a capable academy graduate to Akhtubinsk. Today interesting work and first of all a good salary have been devalued. Having received their academic degrees, specialists, not seeing any prospects for growth, are beginning to think about where they can move. Others request transfers to plants—the major cities and the chances to obtain a normal apartment and to enroll children in kindergartens and schools beckon. In Akhtubinsk, climactic conditions are good for flight testing but, as they say, they are not good for living. Cold, windy winters and hot summers, gnats... Plus an increased risk of catching cholera or the plague, the shortage of milk products, and the frequent unsettled state of everyday life. Even in the "good old days", the state invested money first of all in science, technology and the manufacturing infrastructure and thought about people last. Today, many of the Center's associates live under conditions that are unsuitable for their everyday living conditions.

The collapse of the Soviet Union dramatically worsened the situation. The GLITs branch in Feodosiya went to Ukraine and the Russian ranges in Kazakhstan have been lost. People are returning from there and they have to be housed somewhere. Some of the specialists need to be transferred to Gelendzhik where the test range will be located that has replaced the Feodosiya Range. More housing is required than before but they are building increasingly less housing. Enormous material assets have been left on the territory of Kazakhstan and interstate mechanisms to resolve this problem have not been established.

You don't have to have a lot on the ball to understand: the initial cause for the many misfortunes of both the Flight Test Center and all of aviation science is—finances—more precisely, the catastrophic shortage of them. How will military science and the army as a whole survive under these conditions? Can we really stand idly by?

A ray of hope began to appear after the signing of the documents that authorized the Air Force to sell 1,600 aircraft and to direct the resources obtained to social needs. The presidential directive on outside-budget financing and the involvement of investments for the development of the aircraft industry was the second support. Under conditions when it is impossible to mention an increase of the military budget, this directive essentially became the only channel that permitted the Air Force leadership to begin the search for resources to develop export combat and transport aircraft, helicopters, and various elements of aircraft.

During the last year, something has been done on this path but a number of factors have prevented it from developing at full force. There were those who wanted to acquire the IL-106, AN-70, and other aircraft. Contracts were concluded but the deals fell apart at a certain stage. In various understandings. Moreover, under noble impulses, the Air Force leadership soon attempted to lay a criminal foundation to a certain degree with assistance from the press. That placed on their guard those who were already ready to invest resources in the aircraft industry, yes and the military specialists, except those who were openly nicknamed embezzlers, became thoughtful. As a result, time, which is valued more than money under conditions of a free market, has been lost. So far we are managing to "feed" promises to the most steadfast potential investors but we won't be able to continue to do that for long.

Knowledgeable people assert that the Air Force has developed a series of documents that do not have any equals in Russia. Right now they are at a board of experts at the Highest Economic Council (VES). The first reactions are hopeful. In fact, to balance scientific-test work and to lock them into a single direction, to demonstrate the mechanisms of return of credits, to define the mutual understanding of the investor and the subject of state ownership—means a lot.

"We are not requesting anything," says Air Force Scientific-Technical Committee (NTK) Chairman Major-General Igor Goncharov, "except approval of our activity and imparting an official nature to them."

Air Force specialists know that, having obtained 10 billion rubles worth of credits today (in January's calculations), that two years from now approximately R120-150 billion will be placed into circulation. Already today Air Force scientific institutions are capable of self-reproduction and are prepared for a qualitative resolution of the tasks in accordance with the law on defense. For the Air Force, this is first of all materialization and series production of new aircraft that were recently demonstrated to the public at Akhtubinsk. But the budget appropriations that have been allocated to do this are inadequate. The aircraft that according to the idea should already be accepted into the inventory are still undergoing testing.

We were shown a MIG-29M at the flight test center. The unique aircraft will certainly enjoy export demand, not only because of its brilliant aerodynamic specifications but also because of its fundamentally new combat capabilities. According to NTK calculations, approximately \$3 million are needed in order to complete the program. The sales price of each such aircraft will be approximately \$30 million. How can you argue with that?

Money, money, money... Aviation needs its like air. Therefore the Air Force has also rushed to develop the Russian aircraft revival program at the expense of outside-budget financing. Here they calculate that they will manage to combine investment of dual purpose—military and civilian—aircraft programs. That is not only realistic but also correct. Practically all Russian transport aircraft were born in the bowels of military science. By way of illustration, the Ministry of Defense is delaying financing of the NK-92 engine. The D-27 engine and others have already been developed using Ministry of Defense resources. And the IL-96-300 and other new civilian aircraft will acquire completely new qualities with these engines. That same TU-184, for which this engine was developed, is also expanding its capabilities. An engine from the IL-76 has been installed on a civilian IL-62; and it was made with Ministry of Defense money. Navigation suites, displays, inertial systems,—much is going to civilian aviation from military industry.

Today that is why we need, let's put it this way, a two-stage investment program. The sense of it is that, along with primary strategic developments, the Air Force in parallel will fully develop technologies that will rapidly pay for themselves and will generate profits. This will permit us to support first of all those enterprises that we need to preserve for production of the primary output—aircraft.

A simple example. In the Soviet Union, a total of one plant (in Lugansk) manufactured aircraft batteries. It has remained in Ukraine and difficulties have arisen with mutual payments. Furthermore potassium hydroxide was purchased in Czechoslovakia and dollars would now be required for such purchases... Approximately 30% of Air Force aircraft are standing idle today and it is due to the lack of batteries.

The Air Force is doing whatever it can and to urgently support developments for the creation of a Russian battery industry. At the expense of outside-budget financing. And here they know that they will manage to obtain a significant profit with time at the current cost of that product because, by way of illustration, such deliveries to state organizations, like to the Air Force, will be carried out at one price and deliveries to private companies at another price. Moreover, Germany (practically the only supplier of batteries for the Western aircraft industry) is prepared right now to purchase the Russian product.

The All-Russian Institute of Light Alloys (VILS), that is purposefully working on aircraft, displayed the initiative from our side. However, although it also supplies material practically for all military aircraft and it is aggressively mastering new technologies, including welding magnesium-lithium alloys, right now it is in the same difficult position as other scientific organizations.

VILS is surviving at the expense of organizational developments which it is selling in small quantities at the present time due to the shortage of start-up capital. These are granaries, water tanks and tar paper which exceed similar popular American products. They are also wheels for automobiles, including racing wheels, for which the West is requesting 5,000 per year instead of the 500 supplied today...

There are 117 such programs at the present time. They include a thorough analysis of the market structure, expert assessments of possible Russian manufacturers of products, and conclusions on potential partners.

Everything is ready in order to get to business. They only need support "from above"—from the highest organs of state power and the Ministry of Defense.

Of course, they can "become weaker" in the patchwork quilt of the current military budget but this will result in a situation where the Air Force will be incapable of paying for a single scientific development already in 1994. Everything will go for the payment of the 1993 debt that is arising due to the "fork" between price increases and their indexing. This is the market's mortal grip on the throat of not only the GLITs.

TsIAM is the Central Institute of Aircraft Engine Building. Today it doesn't have the resources, not simply for the operation of unique stand experimental equipment, but even for its storage for future tests.

TsAGI [Central Institute of Aerohydrodynamics imeni N.Ye. Chukovskiy] is already selling its pipes to South Korea. But what can it do? There is no work and there is no possibility of maintaining very rare equipment. Native aviation science is being destroyed.

And how are matters with transport aviation in Russia?

The IL-76 is being manufactured in Uzbekistan, the AN-124 Ruslan in Russia and the engines for it in Ukraine. The AN-70, which should have taken off in May-June, is in Ukraine as is the AN-72.

We need either intergovernmental agreements in order to complete the AN-70 or large-scale financing of the Russian IL-106 to which R70 million have been allocated thus far and more precisely—just for the NK-92 engine for it which we discussed above. Where do we look for the resources?

The Italians propose manufacturing the ATR-42 and the British—a light engine aircraft—at a Russian aircraft plant. Those same Italians have calculated that the cost of a work hour at a plant in our country is 15-35 cents

versus \$13-17 in their historic homeland. It makes direct sense to them to make direct contact. If there is something that is restraining foreigners from more radical steps, it is the political and economic instability in Russia. The possibility of the irretrievable loss of this plant is quite real...

The Air Force has a strategy to resolve urgent tasks. A Russian Aviation Fund has already been created which, as a non-state organization, is capable of assuming a series of powers within the framework of the corresponding law on enterprises and entrepreneurship. This is not a commercial organization—this is a fund. Its task is—within the sphere of the existing system of Air Force orders—to look for investors and to be, on the one hand, the responsible entity to the state for the resources obtained and, on the other hand, to the investors for their investment.

The journalists experienced complex feelings while saying their farewells to Akhtubinsk's hospitable bosses. The monstrous disparity between the righteous labors of these people who are devoted to aviation and the attitude toward them of the state organs of rule cooled the spirit. We were cheered by the fact that, despite all of the misfortunes, the Flight Test Center associates are selflessly directing their business. Today the Center has absorbed all of the contradictions of our time of troubles. But the aviators do not want to sit idly by and wait until the trouble ends.

Yekaterinburg Aircraft, Missile Factory Conversion

934E0735B Yekaterinburg URALSKIY RABOCHIY
in Russian 16 Apr 93 p 2

[Article by Ye. Pervov: "Female Hands Also Strengthen Defense"]

[Text]

[Photo caption] The foreman in the OTK [technical control department] L. Ryaposova and senior foreman of the assembly section A. Yuzhakov check finished goods.

Such a photo could have been seen in a newspaper only in the war years, after which such output was produced behind a thick curtain of secrecy. But journalists from URALSKIY RABOCHIY were given permission to visit an assembly shop of the plant "Uralselmash" in Bisert—the holy of holies of the once closed production system. There is much that is unusual here. But it is especially strange to see the sweet domestic faces of women next to the menacing products.

This tradition goes back to the war years. It was precisely then that the old Demidovskoye production took one of the Leningrad plants under its roof. Certainly the young girls, mothers, wives, and sisters of those who were

fighting were just as accustomed to working next to machine tools. It is said that 1 out of 10 primers for shells came from Bisert....

By the way, not just military production is honored here. The enterprise was literally subjected to an 80-percent conversion within a year to a year-and-a-half. It is not easy to stay afloat in such a situation. This is why "Uralselmash" will gladly take part in the regional exhibition-fair "Conversion-93," where it hopes to find additional markets for the sale of its output and to correct a difficult financial situation. The plant is preparing to present a broad selection of agricultural equipment and consumer goods. But there are also special items: mine cases, aircraft bombs, and defensive and offensive grenades. Not only civilian output of the "defense workers" will be shown at the exhibition-fair "Conversion-93" but also military production.

MIG Joins Belgian Firm To Compete for USAF Trainer Contract

93UM0590A Moscow KOMMERSANT-DAILY
in Russian 6 May 93 p 1

[Article by Mikhail Sergeyev, under the rubric: "The MIG Firm Is Participating in a Competition in the United States": "A Russo-Belgian Aircraft Aspires to Victory"]

[Text] For the first time, Russian aircraft builders are participating in an open international competition—a competition for the development of a trainer aircraft for the American Air Force. Yesterday the Aviation Scientific-Industrial Complex imeni A.I. Mikoyan announced the completion, jointly with the Belgian Firm Promavia, of the design of a new trainer aircraft that is earmarked to compete in the competition. In the event of victory, the Russo-Belgian aircraft will replace obsolete American trainer aircraft and will become the U.S. Air Force's primary fighter trainer aircraft. A possible victory will also ensure orders for Russian aircraft plants since they plan to produce part of the new aircraft's components in Russia.

A new aircraft to train U.S. Air Force and other NATO countries military pilots has already been needed for a long time because, based upon their specifications, the current trainer aircraft do not correspond to the latest generation fighter aircraft—the American F-15 and F-16 and the Russian SU-27 and MIG-29. As a result, last year the Americans announced an international competition for the development of a new aircraft under the arbitrary designation ATTA (Advanced Tactical Trainer Aircraft). A number of aircraft firms have entered the competition for the contract. One of them—the Belgian company Promavia—having prepared its prototype, decided to involve Russian aircraft builders in further development of the design. In 1992, Promavia concluded a contract with the MIG complex to update the design in accordance with the requirements for the ATTA Program. In accordance with that document, the

technical role (selection of parameters, calculations for durability and testing) were transferred to the Russian side and the marketing issues, financing policy and organization of cooperation were left for Promavia.

The joint production plan agreed to by the partners is as follows: Russian aircraft plants will produce the primary assemblies and the final assembly will occur in Canada. Utilization of Russian components in the new aircraft will reduce its cost and, correspondingly, pilot training costs.

Based upon the main economic indicator of trainer aircraft—operation costs per flying hour—the joint design significantly exceeds existing similar aircraft. Operation of the Russo-Belgian trainer aircraft version will cost approximately \$260 per flying hour; current designs have costs of \$600-800 per flying hour.

The final results of the international competition will be summed up at the end of 1993. If the MIG-Promavia design wins the competition, good prospects await the Russian producers: according to predictions, no less than 900 aircraft are needed to replace the U.S. Air Force and NATO fleet of trainer aircraft. At the present time, the design of an American division of Cessna is the most probable competitor of the Russo-Belgian design.

AVIKS Work on Remotely-Piloted Aircraft

93UM0625C Moscow KRASNAYA ZVEZDA
in Russian 5 Jun 93 p 4

[Article by Valentin Rudenko: "The Inspector Is Called 'Hummingbird': An Airborne Ecological Monitoring System Is Being Created"]

[Text] Remote-controlled manned aircraft (DPLAs) had been developed and manufactured until recently exclusively for the army. However, not only military personnel but scientists, ecologists, rescue workers, workers in agriculture and in the river and seagoing fleets, and other specialists have experienced a need for them. A DPLA can be used, you see, to study the atmosphere and the hydrosphere, to measure, for example, the level of radiation and chemical contamination of the ground surface, to monitor the state of various structures, to detect zones of forest fires and floods, to conduct ice reconnaissance—it is impossible to list all of the applications.

Creating an entire family of aircraft so necessary and useful to science and the national economy within the framework of conversion was the goal accepted by designers and engineers of the AVIKS (Aviation and Computer Systems) Scientific-Production Center, established by the Moscow Skorost Machine Building Plant,

the Special Design Office imeni Yakovlev and the Zelenograd Scientific Research Institute of Miniature Instruments. Known worldwide, these firms have considerable experience in designing aircraft and space microelectronics. An airborne remote monitoring and inspection system was the first major development by AVIKS.

"It is intended chiefly to carry out ecological tasks," explained Sergey Dolinskiy, the center's director, "and it includes three complexes, a complex based on the 'Hummingbird' ['Kolibri'] DPLA (the principal one), and 'Lark' ['Zhavoronok'] and 'Stork' ['Aist']."

The "Hummingbird" complex contains surveying DPLA (vehicles with a payload of up to 70 kg), a DPLA-repeater, a ground remote control and information receiving and processing station, a drive and landing station, and a technical maintenance unit. The "Hummingbird" DPLA is designed as an airplane with a pusher propeller. It takes off and lands on a runway just 150 meters long. High operating range—up to 700 km—is an important advantage of the system. This is made possible owing to the DPLA-repeater. Up to 16 aircraft can be in the air simultaneously, and the operator can selectively switch from one DPLA to another.

The "Lark" system was developed for close-up investigation of areas and objects at closer distances and at lower flying speeds. It consists of a gyroplane, a ground remote control and information receiving and processing station, and a launcher made from a cross-country KamAZ truck. Its range is up to 80 km, and the payload weighs up to 15 kg.

The third component of the system is the "Stork" complex, which is an unmanned tethered vertical-takeoff platform (a model is not available yet), a ground remote control and information receiving and processing command station, and a transporter-launcher mounted on an armored personnel carrier.

In distinction from the two preceding systems, the "Stork" is controlled not by radio but by means of a fiber-optic cable. The complex is intended for work at accidents involving nuclear power plants and chemical production operations, and in other places offering a health hazard to man.

Start-up, landing, fueling and replacement of the payload are all done without the crew having to leave the armored personnel carrier. All DPLAs of the airborne monitoring and inspection system can work both jointly and independently.

Dozens of interested departments have expressed a desire to have this system. But financing difficulties may delay realization of the project indefinitely. The AVIKS Scientific-Production Center is seeking investors.

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